

12

THE

CORNELL UNIVERSITY

REGISTER

1884-85



ITHACA, N. Y.

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## CONTENTS.

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CALENDAR.....	5-6
ORGANIZATION AND GOVERNMENT.....	7-11
OFFICERS OF THE UNIVERSITY—	
Trustees.....	12
Faculty.....	13-16
Other officers.....	17-20
CATALOGUE OF STUDENTS .....	21-40
ADMISSION AND CLASSIFICATION OF STUDENTS.....	41-46
RESIDENCE AND GRADUATION.....	47-52
COURSES OF STUDY—	
General Courses.....	53-58
Special and Technical Courses.....	58-72
GENERAL DEPARTMENTS OF INSTRUCTION—	
Agriculture.....	73-78
Architecture.....	78-79
Freehand Drawing .....	79
Chemistry and Physics—	
Physics.....	80-81
Chemistry.....	81-82
Mineralogy and Metallurgy .....	82-83
Agricultural and Analytical Chemistry.....	83-85
Engineering, Civil.....	85-87
Electrical.....	87-88
Marine.....	88
Mining.....	89

History and Political Science—	
General History.....	89
English History.....	90
American History.....	91
Philosophy of History.....	92
Political Economy.....	92
Systematic Politics.....	92
International Law and Diplomacy.....	93
American Law and Jurisprudence.....	93
Social Science (special subjects).....	93
Languages—	
Ancient Classical Languages and Literatures	94-96
Germanic Languages and Literatures.....	96-97
Romance Languages and Literatures.....	98
Oriental Languages and Literatures.....	98
Mathematics and Astronomy.....	99
Mechanic Arts.....	99-101
Military Science and Tactics.....	102-103
Natural History—	
Botany.....	103-105
Geology and Lithology.....	105
Palæontology.....	105-106
Vertebrate Zoölogy.....	106-109
Entomology and Invertebrate Zoölogy.....	109-110
Preliminary Medical Education.....	110-111
Philosophy and Letters—	
Anglo-Saxon and English Literature.....	111-112
Rhetoric and General Literature.....	112-113
Moral and Intellectual Philosophy.....	113
UNIVERSITY LIBRARY.....	114-115
MUSEUM OF NATURAL HISTORY.....	116
PRIZES AND HONORS.....	105-123
UNIVERSITY FELLOWSHIPS AND SCHOLARSHIPS.....	124-127
INSTRUCTIONS FOR STATE SCHOLARSHIPS.....	127-129
EXAMINATION PAPERS—	
For Entrance.....	130-145
For Scholarships.....	145-152
SIXTEENTH ANNUAL COMMENCEMENT.....	153-157
ASSOCIATE ALUMNI.....	158-159
LOCAL ALUMNI ASSOCIATIONS.....	159-160
INDEX.....	161



# THE CALENDAR.

1884-5.

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## FALL TERM—1884.

September	16	Tuesday	Entrance Examinations begin.
September	18	Thursday	REGISTRATION for the Term.
September	19	Friday	Instruction begins.
November	27 } 28 }	Thursday } and Friday }	THANKSGIVING.
December	12	Friday	Term Examinations begin.
December	19	Friday	Term ends.

## WINTER TERM—1885.

January	6	Tuesday	Entrance Examinations begin.
January	8	Thursday	REGISTRATION for the Term.
January	9	Friday	Instruction begins.
January	11	Sunday	Founder's Day.
March	6	Friday	Woodford Prize Competition.
March	20	Friday	Term Examinations begin.
March	27	Friday	Term ends.

## SPRING TERM—1885.

April	4	Saturday	REGISTRATION for the Term.
April	6	Monday	Instruction begins.
May	18	Monday	Commencement Essays due.

May	25	Monday	Theses for advanced degrees due.
June	1	Monday	Senior Examinations begin.
June	2	Tuesday	Examinations for Second Degrees.
June	5	Friday	Term Examinations begin.
June	12	Friday	Term Examinations end.
June	15	Monday	Entrance Examinations begin.
June	16	Tuesday	Class Day.
June	17	Wednesday	{ Alumni Day. Annual Meeting of the Trustees.
June	18	Thursday	
			ANNUAL COMMENCEMENT.

## FALL TERM—1885-6.

September	15	Tuesday	Entrance Examinations begin.
September	17	Thursday	REGISTRATION for the Term.
September	18	Friday	Instruction begins.

# ORGANIZATION AND GOVERNMENT.

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## FOUNDATION OF THE UNIVERSITY.

The existence of Cornell University is due to the bounty of the United States and of Ezra Cornell. On the second day of July, 1862, Congress passed an act granting public lands to the several States which should "provide at least one college where the leading objects shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts." Thirty thousand acres for each of its senators and representatives in Congress were appropriated to every State; and the share of the State of New York was nine hundred and ninety thousand acres in land scrip.

On the twenty-seventh of April, 1865, the Legislature of New York incorporated "The Cornell University," appropriating to it the income arising from the sale of this land scrip. The most important conditions were, that Ezra Cornell should give to the University five hundred thousand dollars; that the University should give instruction in branches relating to agriculture, mechanic arts, and military tactics; and that it should receive, without charge for tuition, one student annually from each assembly district. Mr. Cornell fulfilled the first requirement of the charter, and made an additional gift of more than two hundred acres of land, with buildings, to be used as a farm in connection with the department of agriculture.

The Act of Incorporation satisfies the condition of the congressional grant by providing for instruction in such branches of learning as are related to agriculture and the mechanic arts, and in military tactics, "in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." And it further declares that "such other

branches of science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University, as the trustees may deem useful and proper."

The University, organized in accordance with the requirements of its charter, was opened on the seventh of October, 1868.

### TRUSTEES.

The number of trustees, when the Board is full, is twenty-three. The eldest male lineal descendant of the Founder is, by the law of the State, a trustee, as are also seven others, the President of the University, the Governor of the State of New York, the Lieutenant-Governor, the Speaker of the Assembly, the Superintendent of Public Instruction, the President of the State Agricultural Society, and the Librarian of the Cornell Library.

Of the remaining fifteen, two are elected annually by the trustees and one by the alumni. The term of every trustee not *ex officio* is five years.

### FACULTY.

The Faculty consists of professors, associate professors, and assistant professors, and is aided by non-resident professors and lecturers, and by instructors and examiners. It comprises the following special faculties: Arts; Literature; Philosophy; Science; Agriculture; Architecture; Chemistry and Physics; Civil Engineering; Mathematics; Mechanic Arts; Natural History; and History and Political Science. The several special faculties constitute standing committees to which are referred questions relating to the departments under their control, but their action is subject to the approval of the general faculty.

### STATE STUDENTS.

The ninth paragraph of the original Act of Incorporation provides for the admission of one student annually from each assembly district without payment of tuition. The number thus received, when all the scholarships are filled, is five hundred and twelve. These State students are to be selected, by yearly competitive examinations, from the various academies and public schools of the State. It is the duty of the school commissioners of counties and of the boards of education of cities to hold and conduct such examinations, and to award the scholarships. As



the law requires the selection of "the best scholar," no distinction on account of sex is recognized in the competition. For further details regarding this subject, see instructions with regard to Scholarships, under the appropriate head below.

### OPTIONAL AND SPECIAL STUDENTS.

It was one of the leading objects in founding the University to provide for the wants of those who, though earnest and industrious students, cannot complete a full four-year course. The class distinctions which are in most cases strictly observed elsewhere, are not regarded by the Faculty of the University as any obstacle to recitation and attendance upon lectures with any class which the student is prepared to join.

Special students are admitted for a limited period without examination. They must be twenty-one years old, and of approved character and attainments.

### GRADUATE STUDENTS.

For purposes of advanced study the University extends its privileges to its own graduates, and to graduates of like standing from other colleges and universities, and it confers advanced degrees under conditions described elsewhere; but graduate students who are not candidates for a degree are received in any department, and for any length of time.

### HIGHER EDUCATION OF WOMEN.

By an act of the trustees, passed in April, 1872, women are admitted to the University on the same terms as men, except that they must be seventeen years old. A separate building, the Sage College, has been erected and furnished for their residence. The entrance examinations and all the studies, except military science, are the same for women as for men.

In view of the superior advantage to lady students afforded by the Sage College, it has been decided that hereafter "all lady students of the University shall be required to room and board in Sage College, unless specially excused for due cause shown, by the Sage College Committee." This committee is composed of the chairman of the Board of Trustees and the President and Treasurer of the University. Any ladies wishing to enter the University, who can assign really valid reasons for residing else-

where than in Sage College, should send in a request with reasons for it, at the earliest date possible, to the President of the University.

In order to give Sage College more of the safeguards of a well ordered home, and to bring its inmates directly under an influence akin to that of the family, the Trustees, during the year 1884-5, have established a lady principalship, the intention being to have a lady of high character, attainments, and social position living at the college, associating with its students, ready to give suggestions as to their general culture, and counsel in special matters at any moment, and to act toward them at all times as a friend and adviser.

The lady called to this position is Mrs. Agnes M. Derkhien, formerly of Philadelphia, and her success thus far seems to leave no doubt as to the wisdom of the new arrangement.

Additional provision has also been made for physical culture in the Sage College Gymnasium. The Professor, Edward Hitchcock, Jr., M. D., and his assistant in this department, have organized a system of physical exercises calculated to maintain and develop the physical strength of young women, and at the same time to prevent any of the evils which might arise from exercises that are too violent or too long continued.

The exercises thus provided for are obligatory upon all residents of the college, subject to exceptions in particular cases by the Lady Principal and by Dr. Hitchcock.

### RELIGIOUS SERVICES.

The University, established by a government which recognizes no distinction of religious belief, seeks neither to promote any creed, nor to exclude any. By the terms of its charter, persons of any religious denomination or of no religious denomination are equally eligible to all offices and appointments, but it is expressly ordered that "at no time shall a majority of the board of trustees be of any one religious sect, or of no religious sect."

In the University Chapel—the gift of the Hon. Henry W. Sage—religious services are held, and discourses delivered by eminent clergymen selected from the various Christian denominations.

### PHYSICAL CULTURE.

For the physical training and development of students there has been provided a Gymnasium, thoroughly equipped with baths



and all necessary appliances for bodily culture. This is under the charge of an experienced physician, the Professor of Physical Culture and Director of the Gymnasium, who examines every student at his entrance and at stated intervals thereafter, learns the condition of his health, takes his physical measurements, and prescribes such exercises as may be required for his complete and symmetrical bodily development. The gymnasium is also open to all members of the University for voluntary exercise; but the Professor of Physical Culture is in constant attendance, and no student is suffered to indulge in hazardous or excessive athletic efforts, or to attempt any feat which in his individual case might be attended with risk. A supplementary gymnasium at the Sage College for the lady students, is conducted on the same general plan. In the physical training of the students the practical instruction in military science is found a valuable aid.

#### CHRISTIAN ASSOCIATION.

The Christian Association is an organization of students and professors for the promotion of their religious culture, and for Christian work in the University. Rooms have been fitted up for its use in White Hall, where meetings are held once a week or oftener. A committee of this association is in attendance at Association Hall during the first week of every fall term for the purpose of assisting those entering the University with information in regard to rooms, board, times and places of examinations, etc., and in general to afford any assistance in their power which students who are strangers in Ithaca may feel inclined to seek from them.

# OFFICERS OF THE UNIVERSITY.

## TRUSTEES.

Hon. ALONZO B. CORNELL, . . . . .	New York City.	
The PRESIDENT of the University, . . . . .	<i>Ex officio.</i>	
His Excellency the GOVERNOR of New York, . . . . .	"	
His Honor the LIEUTENANT-GOVERNOR, . . . . .	"	
The SPEAKER of the Assembly, . . . . .	"	
The SUPERINTENDENT of Public Instruction, . . . . .	"	
The PRESIDENT of the State Agricultural Society, . . . . .	"	
The LIBRARIAN of the Cornell Library, . . . . .	"	
Hon. HENRY B. LORD, . . . . . Ithaca.	} Term of office expires in 1885.	
Hon. ERASTUS BROOKS, . . . . . New York.		
Hon. DOUGLAS BOARDMAN, . . . . . Ithaca.		
Hon. AMASA J. PARKER, . . . . . Albany.	} Term of office expires in 1886.	
GEORGE R. WILLIAMS, Esq., . . . . . Ithaca.		
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Hon. SAMUEL CAMPBELL, . . . . . New York Mills.	} Term of office expires in 1887.	
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J. DE WITT WARNER, Esq., . . . . . New York.		
Hon. GEORGE W. SCHUYLER, . . . . . Ithaca.	} Term of office expires in 1888.	
ALFRED S. BARNES, Esq., . . . . . New York.		
JAMES F. GLUCK, Esq., . . . . . Buffalo.		
Hon. HIRAM SIBLEY, . . . . . Rochester.	} Term of office expires in 1889.	
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Hon. JOSEPH B. FORAKER, . . . . . Cincinnati, O.		

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HENRY W. SAGE, . . . . .	Chairman
WILLIAM R. HUMPHREY, . . . . .	Secretary
EMMONS L. WILLIAMS, . . . . .	Acting Treasurer

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ANDREW D. WHITE,	DOUGLAS BOARDMAN,
HENRY W. SAGE,	MYNDERSE VAN CLEEF,
GEORGE W. SCHUYLER,	GEORGE R. WILLIAMS.
EMMONS L. WILLIAMS, Secretary.	

## FACULTY.

ARRANGED, WITH THE EXCEPTION OF THE OFFICERS OF THE FACULTY, IN THE  
ORDER OF SENIORITY OF APPOINTMENT.

THE HON. ANDREW DICKSON WHITE, LL.D.,  
University Grounds  
PRESIDENT, *Professor of History.*

THE REV. WILLIAM DEXTER WILSON, D.D., LL.D.,  
L.H.D., 109 Cascadilla  
REGISTRAR, *Professor of Moral and Intellectual Philosophy.*

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University Grounds  
SECRETARY OF THE FACULTY, *Professor of Agricultural  
and Analytical Chemistry.*

BURT GREEN WILDER, B.S., M.D., 148 E. Buffalo St.  
*Professor of Physiology, Comparative Anatomy, and Zoölogy.*

JAMES LAW, F.R.C.V.S., University Grounds  
*Professor of Veterinary Medicine and Surgery.*

ALBERT NELSON PRENTISS, M.S., University Grounds  
*Professor of Botany, Horticulture, and Arboriculture.*

JOHN LEWIS MORRIS, A.M., C.E., University Grounds  
*Sibley Professor of Practical Mechanics and Machine  
Construction.*

THOMAS FREDERICK CRANE, A.M., University Grounds  
*Professor of the Romance Languages and Literatures.*

CHARLES ASHMEAD SCHAEFFER, A.M., Ph.D.,  
103 E. Seneca St.  
*Professor of General and Analytical Chemistry, and of  
Mineralogy.*

FREDERICK LOUIS OTTO RÆHRIG, Ph.D., M.D.,  
University Grounds  
*Professor of Sanskrit and Living Asiatic Languages.*

HIRAM CORSON, A.M., LL.D., Cascadilla Cottage  
*Professor of Anglo-Saxon and English Literature.*

WATERMAN THOMAS HEWETT, A.M., Ph.D.,  
University Grounds  
*Professor of the German Language and Literature.*

LUCIEN AUGUSTUS WAIT, A.B., University Grounds  
*Associate Professor of Mathematics.*

ISAAC FLAGG, Ph.D., Cor. Hazen and Mitchell Sts.  
*Professor of the Greek Language and Literature.*

CHARLES CHAUNCY SHACKFORD, A.M.,  
University Grounds  
*Professor of Rhetoric and General Literature.*

THE REV. CHARLES BARCOCK, A.M., University Grounds  
*Professor of Architecture.*

JAMES EDWARD OLIVER, A.M., 69 Heustis St.  
*Professor of Mathematics.*

WILLIAM ARNOLD ANTHONY, Ph.B., 9 W. Buffalo St.  
*Professor of Physics and Experimental Mechanics.*

ESTEVAN ANTONIO FUERTES, C.E., 170 E. State St.  
*Professor of Civil Engineering.*

EDWIN CHASE CLEAVES, B.S., Cortland  
*Associate Professor of Freehand Drawing and Mechanical  
Drawing.*

ISAAC PHILLIPS ROBERTS, M.Agr., University Grounds  
*Professor of Agriculture.*

CHARLES LEE CRANDALL, C.E., 100 Hector St.  
*Assistant Professor of Civil Engineering.*

IRVING PORTER CHURCH, C.E., 151 E. Seneca St.  
*Assistant Professor of Civil Engineering.*



HORATIO STEVENS WHITE, A.B., University Grounds  
*Professor of the German Language and Literature.*

JOHN HENRY COMSTOCK, B.S., University Grounds  
*Professor of Entomology and General Invertebrate Zoölogy.*

WILLIAM RUSSELL DUDLEY, M.S., 108 Cascadilla  
*Assistant Professor of Cryptogamic Botany.*

GEORGE WILLIAM JONES, A.M., 17 Factory St.  
*Assistant Professor of Mathematics.*

SAMUEL GARDNER WILLIAMS, A.M., Ph.D.,  
Corner Green and Albany Sts.  
*Professor of General and Economic Geology.*

HENRY SHALER WILLIAMS, Ph.D., University Grounds  
*Professor of Palæontology.*

WILLIAM RUFUS PERKINS, A.B., 23 Quarry St.  
*Assistant Professor of History.*

GEORGE SYLVANUS MOLER, A.B., B.M.E.,  
156 N. Aurora St.  
*Assistant Professor of Physics.*

WILLIAM GARDNER HALE, A.B., University Grounds  
*Professor of the Latin Language and Literature.*

JOHN BURKITT WEBB, C.E., 130 E. Buffalo St.  
*Professor of Applied Mathematics and Theoretical Mechanics.*

SIMON HENRY GAGE, B.S., 148 Cascadilla  
*Assistant Professor of Physiology, and Lecturer on Microscopical Technology.*

CHARLES FRANCIS OSBORNE, 58 Cascadilla  
*Assistant Professor of Architecture.*

THE REV. MOSES COIT TYLER, LL.D., L.H.D.,  
135 E. Seneca St.  
*Professor of American History.*

SPENCER BAIRD NEWBURY, E.M., Ph.D.,  
University Grounds.  
*Assistant Professor of General Chemistry, Mineralogy, and Assaying.*

HERBERT TUTTLE, A.M., University Grounds  
*Associate Professor of the History and Theory of Politics,  
and of International Law.*

HENRY CARTER ADAMS, Ph.D.,

*Associate Professor of Political Economy.*

WALTER SCRIBNER SCHUYLER, 1st Lieut. 5th Cav.,  
U.S.A., 81 E. Buffalo St.

*Professor of Military Science and Tactics.*

WALTER MARTIN MCFARLAND, Assist. Engineer,  
U.S.N., 23 Quarry St.

*Assistant Professor of Mechanical Engineering.*

EDWARD HITCHCOCK, JR., A.M., M.D., 100 Cascadilla  
*Acting Professor of Physical Culture and Director of the  
Gymnasium.*

CHARLES DAVID MARX, C.E., Professor Wait's  
*Assistant Professor of Civil Engineering.*

GEORGE WILLIAM HARRIS, Ph.B., 142 E. Seneca St.  
*Acting Librarian.*

#### LECTURERS AND NON-RESIDENT PROFESSORS.

GOLDWIN SMITH, LL.D., L.H.D., Toronto, Canada  
*Lecturer on English Constitutional History.*

CHARLES KENDALL ADAMS, LL.D., Ann Arbor, Mich.  
*Non-Resident Professor of English Constitutional History.*

FRANK B. SANBORN, M.A., Concord, Mass.  
*Lecturer on Social Science.*

#### INSTRUCTORS AND EXAMINERS.

SAMUEL JACQUES BRUN, B.S., Osmond Place  
*Instructor in French.*

JOHN CAREW ROLFE, A.B., 152 E. Seneca St.  
*Instructor in Latin.*

JULIUS JOHN WILLIAM KRUEGER, 69 Heustis St.  
*Instructor in German.*

HENRY WINCHESTER ROLFE, A.B., 69 Heustis St.  
*Instructor in Rhetoric and Composition.*



FREDERICK ARTHUR HOLTON, B.S.,	41 White Hall
<i>Instructor in Chemistry.</i>	
JAMES McMAHON, A.B.,	69 Heustis St.
<i>Instructor in Mathematics.</i>	
PAUL DANIEL BRUN,	Osmond Place
<i>Instructor in French.</i>	
JAMES LUND, B.S.,	University Avenue
<i>Instructor in Chemistry.</i>	
HERBERT MILLS PERRY, A.B.,	Professor Wait's
<i>Examiner in Mathematics.</i>	
WILLIAM COLLIER DOLE, JR.,	92 Cascadilla
<i>Instructor in Gymnastics.</i>	

## OTHER OFFICERS.

WESLEY NEWCOMB, M.D.,	26 E. Seneca St.
<i>Curator of the Newcomb Collection of Shells.</i>	
FRED LUCIUS KILBORNE, B.Agr.,	University Grounds
<i>Anatomical Preparator.</i>	

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GEORGE W. TAILBY,	University Grounds
<i>Foreman of the Farm.</i>	
MILES LORING CLINTON,	65 Cascadilla
<i>Foreman of the Machine Shop.</i>	
WILLIAM OGDEN KERR,	101 Cascadilla
<i>Meteorological Observer.</i>	
FRED CLARKSON FOWLER,	75 W. Mill St.
<i>Special Mechanical Assistant.</i>	
HARRY FALKENAU,	69 Eddy St.
<i>Master of the Chimes.</i>	

SPECIAL FACULTIES.

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The President of the University is *ex officio* Chairman of each of the special faculties. In the absence of the President, the Professor whose name is printed first on the list of its members, is the acting Chairman.

ARTS—Professor FLAGG, Professors ANTHONY, HALE, OLIVER, SHACKFORD, WILSON, and PERKINS.

LITERATURE—Professor SHACKFORD, Professors CORSON, CRANE, HALE, HEWETT, WAIT, H. S. WHITE, WILDER, and WILSON.

PHILOSOPHY—Professor WILSON, Professors ANTHONY, COMSTOCK, CRANE, OLIVER, PRENTISS, SCHAEFFER, H. S. WHITE, H. S. WILLIAMS, S. G. WILLIAMS, and WILDER.

SCIENCE—Professor ANTHONY, Professors COMSTOCK, CRANE, HEWETT, PRENTISS, SCHAEFFER, WAIT, H. S. WILLIAMS, S. G. WILLIAMS, WILDER, and WILSON.

AGRICULTURE—Professor Roberts, Professors CALDWELL, COMSTOCK, LAW, PRENTISS, and S. G. WILLIAMS.

ARCHITECTURE—Professor BABCOCK, Professors FUERTES, OLIVER, CLEAVES, and OSBORNE.

CHEMISTRY AND PHYSICS—Professor SCHAEFFER, Professors ANTHONY, CALDWELL, MOLER, and NEWBURY.

CIVIL ENGINEERING—Professor FUERTES, Professors ANTHONY, BABCOCK, MORRIS, OLIVER, SCHAEFFER, CHURCH, CRANDALL, and MARX.

MATHEMATICS—Professor OLIVER, Professors ANTHONY, BABCOCK, FUERTES, MORRIS, WEBB, WAIT, and JONES.

THE SIBLEY COLLEGE OF MECHANIC ARTS—Professor MORRIS, Professors ANTHONY, BABCOCK, FUERTES, WEBB, WAIT, CLEAVES, and McFARLAND.

NATURAL HISTORY—Professor PRENTISS, Professors COMSTOCK, LAW, WILDER, H. S. WILLIAMS, S. G. WILLIAMS, WILSON, DUDLEY, and GAGE.

HISTORY AND POLITICAL SCIENCE—Professor A. D. WHITE, Professors CRANE, HALE, TUTTLE, TYLER, H. S. WHITE, WILSON, PERKINS, and H. C. ADAMS.

## THE UNIVERSITY LIBRARY.

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### LIBRARY COUNCIL.

The PRESIDENT of the University and the ACTING LIBRARIAN, *ex officiis*; Hon. H. B. LORD, of the Trustees, and of the Faculty, Professors CALDWELL, CRANE, FUERTES and TYLER.

THE LIBRARY SERVICE. — Acting Librarian: GEORGE WILLIAM HARRIS, Ph.B. Cataloguers: HORACE SAUERS KEPHART, A.B., EDWIN HAMLIN WOODRUFF. Assistants: PHILIP PRICE BARTON, LEWIS HENRY TUTHILL, A.B.

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## THE MUSEUM OF NATURAL HISTORY.

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### COUNCIL OF THE MUSEUM OF NATURAL HISTORY.

The PRESIDENT of the University, *ex officio*; WILLIAM R. HUMPHREY, Esq., of the Board of Trustees; Professors COMSTOCK, LAW, PRENTISS, WILDER, S. G. WILLIAMS, H. S. WILLIAMS, WILSON, DUDLEY, and GAGE, of the Faculty.

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## THE UNIVERSITY GYMNASIUM.

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### GYMNASIUM COUNCIL.

The PRESIDENT, *ex officio*; GEORGE R. WILLIAMS, Esq., of the Trustees; the Professor of Physical Culture, Professor HITCHCOCK; of Military Science, Professor SCHUYLER; of Physiology, Professor WILDER, *ex officiis*.

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### COMMITTEE ON DRILL AND MILITARY SCIENCE.

Professors SCHUYLER, HITCHCOCK and WILSON.

## UNIVERSITY PREACHERS, 1884-5.

*(On the Dean-Sage Foundation.)*

## FALL TERM.

- Sept. 28—The Rev. S. J. McPHERSON, D.D., of Chicago, Ill.  
 Oct. 5—The Rev. O. H. TIFFANY, D.D., of New York City.  
 Oct. 12—The Rev. EDWARD EVERETT HALE, D.D., of Boston  
 Mass.  
 Oct. 19—The Rev. EDWARD JUDSON, D.D., of New York City.  
 Oct. 26—The Rev. CHARLES R. BAKER, of Brooklyn, N. Y.  
 Nov. 2—The Rev. JOSEPH ANDERSON, D.D., of Waterbury, Ct.  
 Nov. 9—The Rev. THEODORE W. HOPKINS, of Rochester, N. Y.  
 Nov. 16—The Rev. Bishop CYRUS D. FOSS, D.D., LL.D., of Min-  
 neapolis, Minn.  
 Nov. 23—The Rev. Professor FRANCIS GREENWOOD PEABODY, of  
 Cambridge, Mass.  
 Nov. 30—The Rev. C. D. W. BRIDGMAN, D.D., of New York City.<sup>1</sup>

## SPRING TERM.

- April 12—The Rev. JOSEPH T. DURYEA, D.D., of Boston, Mass.  
 April 19—The Rev. JAMES M. WHITON, Ph.D., of Newark, N. J.  
 April 26—The Rev. ISAAC ERRETT, D.D., of Cincinnati, O.  
 May 3—The Rev. JOHN R. PAXTON, D.D., of New York City.  
 May 10—The Rev. Bishop WM. X. NINDE, D.D., of Evanston, Ill.  
 May 17—The Rev. ROBERT COLLYER, of New York City.  
 May 24—The Rev. WAYLAND HOYT, D.D., of Philadelphia, Pa.  
 May 31—The Rev. CHARLES C. TIFFANY, D.D., New York City.  
 June 7—The Rev. JOSEPH R. TWICHELL, of Hartford, Ct.  
 June 14—(Baccalaureate Sermon). The Rev. ALEXANDER MC-  
 KENZIE, of Cambridge, Mass.

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<sup>1</sup> The Rev. Dr. Bridgman, being unable to fulfill his appointment, the sermons were preached by the Rev. S. R. Calthorp, D.D., of Syracuse.



# CATALOGUE OF STUDENTS.

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## FELLOWS FOR 1884-5.

(See p. 124).

THE CORNELL FELLOWSHIP,

Charles Smith Prosser, B.S., *Natural History*

THE MCGRAW FELLOWSHIP,

Frank Sherman Washburn, B.C.E., *Civil Engineering*

THE SAGE FELLOWSHIP,

Harriet Elizabeth Grotecloss, B.S., *Entomology and Botany*

THE SCHUYLER FELLOWSHIP,

James Gilbert White, A.B. (Pa. State), *Electrical Engineering*

THE SIBLEY FELLOWSHIP,

Edward Charles Murphy, B.C.E., *Mathematics*

THE GOLDWIN SMITH FELLOWSHIP,

Ernest Emory Russell, Ph.B., *History and Political Science*

THE PRESIDENT WHITE FELLOWSHIP,

Andrew Curtis White, A.B. (Hamilton), *Classical Philology*

## RESIDENT GRADUATES.

Arthur, Joseph Charles, B.S., M.S., Botany and Entomology  
Iowa Agricultural College.

Baltzell, Winton James, A.B., History and Literature  
Lebanon Valley College.

Cox, William Stakely, B.E., Architecture  
State College of Alabama.

- Curnow, George Trevilyan, B.M.E.,  
Architecture and Miscellaneous Drafting
- Cushing, Harry Platt, Ph.B., M.S.,  
Geology
- Fay, Frederick Willis, A.B.,  
Ohio State University.  
Architecture
- Furry, Frank Eugene, B.S.,  
Iowa State College.  
Chemistry
- Gage, Kitty Augusta, A.B.,  
Boston University.  
Ancient Languages
- Hainer, Julius Cæsar, A.B.,  
Iowa Agricultural College.  
Physics
- Huffeut, Ernest Wilson, B.S.,  
History and Political Science
- Kerr, Milton Royce, B.S.,  
Geology and Palæontology
- Linthicum, Cadwallader Edwards, A.B.,  
Yale College.  
Civil Engineering
- Messenger, Hiram John, Lit.B.,  
Mathematics
- Mineah, Mary Anna, A.B.,  
Vassar College.  
History and English Literature
- Naeseth, Christen Andreos, A.B.,  
Norwegian Lutheran College.  
History and English Literature
- Parr, Samuel Wilson, B.S.,  
University of Illinois.  
Natural History
- Peek, Ezra Jones, A.B., A.M.,  
Williams College.  
Classical Philology
- Petit, Amelie Veronica, Ph.B., Ph.M.,  
Syracuse University.  
Modern Languages
- Robinson, Jennie Justina, A.B.,  
Smith College.  
History and Political Science
- Turner, Ebenezer Tousey, B.C.E.,  
Chemistry and Physics
- Turner, William Savage, B.S. and M.S.,  
Knox College.  
Electrical Engineering
- Tuthill, Lewis Henry, A.B.,  
Classical Languages and Literature



## UNDERGRADUATES.

## SCHOLARSHIPS FOR 1884-8.

(See p. 124).

## UNIVERSITY SCHOLARSHIPS.

## THE CORNELL SCHOLARSHIP,

Lyman Austin Best, *Course in Civil Engineering*  
Hornell Free Academy—D. L. Freeborn, A.B., LL.B., Principal.

## THE H. B. LORD SCHOLARSHIP,

William Clark Fisher, *Course in Arts*  
Onondaga Academy—O. W. Sturdevant, A.M., Principal.

## THE MCGRAW SCHOLARSHIP,

Alvah Deyo Hasbrouck, *Course in Civil Engineering*  
J. R. Leslie, A.M., Private School, Poughkeepsie.

## THE SAGE SCHOLARSHIP,

Henry Burrowes Lathrop, *Course in Arts*  
At home with his father, the Rev. H. D. Lathrop, D.D.,  
Walla Walla, W. T.

## THE SIBLEY SCHOLARSHIP,

Andrew Spencer, Jr., *Course in Science and Letters*  
Cooperstown Union School—J. G. Wright, A.M., Principal.

## THE PRESIDENT WHITE SCHOLARSHIP,

Mary Margarette Wardwell, *Course in Architecture*  
Buffalo High School—H. P. Emerson, A.M., Principal.

## SAGE SCHOLARSHIPS FOR WOMEN.

Lottie Irene Earll, *Course in Arts*  
Syracuse High School—G. A. Bacon, A.B., Ph.D., Principal.

Gertrude Gladys France, *Course in Arts*  
Skaneateles Union School—F. C. Whitney, A.B., Principal.

Mary Anna Widman, *Course in Philosophy*  
Freeport (Ill.) High School—A. W. Greene, B.C.E., Principal.

## SENIORS.

Atkinson, George Francis,	<i>Monroe, Mich.,</i>	Philosophy
Avila, Arao Ferreira de,	<i>San Paulo, Brazil,</i>	Elect. Eng.
Baker, Edward Everett,	<i>Cedar Hill,</i>	Science and Letters
Benediet, Frederick Staples,	<i>Brockport,</i>	Architecture
Bennett, Burton Ellsworth,	<i>North Brookfield,</i>	Sc. and Letters
Bickford, Chauncey Howard,	<i>Belleville,</i>	Arts
Bliss, Russell Joseph,	<i>Peterboro,</i>	Philosophy
Bostwick, Edward Hermon,	<i>Ithaca,</i>	Science and Letters
Breed, Arthur Minier,	<i>Big Flats,</i>	Agriculture
Brooks, Edgar Gerson,	<i>Salt Lake City, Utah,</i>	Sc. and Let.
Bull, John, Jr.,	<i>Slaterville,</i>	Science and Letters
Chappell, Fred Martin,	<i>Montezuma,</i>	Natural History
Church, Wilmer,	<i>High Falls,</i>	Mechanic Arts
Clock, Cora May,	<i>Ithaca,</i>	Science and Letters
Coimbra, Anastasio Rodrigues de Aquino,	<i>Tres Ilhas, Brazil,</i>	Optional
Comstock, Anna Botsford,	<i>Ithaca,</i>	Natural History
Cooper, Edgar Howland,	<i>New York City,</i>	Civil Engin'ing
Corser, Mary Elwood,	<i>Minneapolis, Minn.,</i>	Literature
Cummings, Frederiek Douglas,	<i>Tully,</i>	Science and Letters
Curtis, Charles Elbert,	<i>Ithaca,</i>	Civil Engineering
Dearstyne, Florence Evelyn,	<i>Sandy Hill,</i>	Science and Letters
Doolittle, Clarence Everett,	<i>Washington, D. C.,</i>	Elect. Eng.
Eidlitz, Robert James,	<i>New York City,</i>	Architecture
Elliott, Orrin Leslie,	<i>Centreville,</i>	Hist. and Polit. Sc.
Falkenau, Harry,	<i>Chicago, Ill.,</i>	Literature
Fisher, Bertrand Hand,	<i>Wellington, O.,</i>	Civil Engineer'g
French, James Benton,	<i>New Hartford,</i>	Civil Engineering
Good, Arthur Carroll,	<i>Buffalo,</i>	Science and Letters
Halbert, Henry Daniel,	<i>Vanceburg, Ky.,</i>	Civil Eng.
Harris, Rollin Arthur,	<i>Jamestown,</i>	Philosophy
Hartzell, Albert Ankeny,	<i>Buffalo,</i>	Science and Letters
Hough, Elida Crofoot,	<i>Lowville,</i>	Arts
Kelley, Charles Lester,	<i>Arcadia,</i>	Civil Engineering

Lain, David Emmet,	West Town,	Electrical Eng.
Larned, Francis Madison,	Chicago, Ill.,	Literature
Lillis, Thomas Francis,	Coventryville,	Civil Engineering
Lima, Casimiro Eugenio Amoroso,	Rio Janeiro, Brazil,	Agriculture
McCall, James,	Bath,	Arts
Merry, Martha,	Phœnix,	Science and Letters
Mossdrop, Alfred Mitton,	Brooklyn,	Civil Engineering
Olmsted, Henry Collier,	Binghamton,	Arts
Penny, George Barlow,	Haverstraw,	Science and Letters
Powell, George Wilson,	Reed's Corners,	Civil Eng.
Seeley, Florence Corinne,	Rochester,	Literature
Smith, Charlotte,	Snith's Mills,	Philosophy
Smith, Charles Henry,	New Haven,	Mechanic Arts
Smith, Jeannie Azilla,	Bath,	Science and Letters
Smith, Wilbur Hazleton,	Little Valley,	Arts
Smith, William Charles,	Bath,	Civil Engineering
Snow, Benjamin Warner,	La Salle, Ill.,	Chem. and Physics
Snyder, Charles Earl,	Herkimer,	Science and Letters
Stevens, Stoddard More,	Rome,	Hist. and Pol. Science
Stowell, William Mix,	Brighton,	Mechanic Arts
Van Sickel, John,	Cayuga,	Science and Letters
Van Vranken, George Williamson,	Lisha's Kill,	Hist. and Pol. Sc.
Ware, Richard,	Washington, D. C.,	Arts
Weston, William Henry,	Philadelphia, Pa.,	Elect. Eng.
Whaley, James Higgins,	Rome,	Natural History
Willard, Julia Etta,	Watertown,	Literature

## JUNIORS.

Austin, Ennis Raymond,	Owasco,	Architecture
Baker, Charles Hinckley,	Chicago, Ill.,	Civil Engineering
Baker, Howard Winfield,	Chicago, Ill.,	Civil Engineering
Barney, William Grant,	Elmira,	Science and Letters
Barton, Philip Price,	Lock Haven, Pa.,	Hist. and Pol. Sc.
Beardsley, Harry Merchant,	Elmira,	Hist. and Pol. Science
Brodie, Hugh,	Woodville,	Science and Letters
Brundage, Charles Hubert,	Penn Yan,	Optional



Cahill, Rose Hannah,	Binghamton,	Philosophy
Carolan, Herbert,	San Francisco, Cal.,	Sc. and Let.
Cassidy, Jessie Jane,	Brooklyn,	Architecture
Chapman, Ernest Albert,	Groton,	Science and Letters
Charpiot, Henry Charles,	Denver, Col.,	Science and Let.
Converse, Frank Alvah,	Woodville,	Agriculture
Coville, Addison Luzerne,	Oxford,	Natural History
Curtis, Annie Neale,	Boston, Mass.,	Sc. and Letters
Darlington, William,	West Chester, Pa.,	Mechanic Arts
Day, William Asher,	Wilbraham, Mass.,	Mechanic Arts
Devin, Abe,	Des Moines, Iowa,	Mech. Arts
Dunham, Andrew Ellsworth,	Sauquoit,	Science and Letters
Dunham, Fredd Hall,	Johnsonsburg,	Sc. and Letters
Dusinberre, George Brown, Jr.,	Geneva,	Electrical Engineering
Ehle, Boyd,	Fort Plain,	Civil Engineering
Eltinge, Maurice Wurts,	New Paltz,	Science and Letters
Emory, Arthur Theodore,	Unadilla,	Arts
Fitts, Fay Martin,	Dresserville,	Science and Letters
French, Eldon Lewis,	Housatonic, Mass.,	Elect. Eng.
Gadsby, Herbert Hume,	Gilbertsville,	Arts
Gillette, Henry Taft,	Cherry Valley,	Science and Let.
Grant, Arthur Hastings,	New York City,	Civil Eng.
Harris, Gilbert Dennison,	Jamestown,	Philosophy
Hawley, Abraham Lincoln,	Taylor,	Civil Engineering
Hill, Robert Thomas,	Comanche, Texas,	Nat. History
Hinman, Delon Marcus,	Denver, Col.,	Optional
Hoffeld, Henry Rudolph,	Lancaster,	Civil Engineering
Howard, Frank Thurber,	Ithaca,	Arts
Howland, Herbert Slocum,	Sherwood,	Optional
Hubbard, Walter Stacy,	Portville,	Optional
Hull, Charles Henry,	Ithaca,	Hist. and Pol. Science
Hyatt, Louis Eugene,	Lansingburg,	Hist. and Pol. Sc.
Ingalls, Owen Lovejoy,	Peterboro,	Civil Engineering
Kittredge, Helen,	Boston, Mass.,	Sc. and Letters
Lima, Elias David Abinun de,	New York City,	Sc. and Letters
Loeser, Abraham,	Buffalo,	Science and Letters
Lorber, Lewis James Edward Joseph,	Ithaca,	Arts
McCann, George,	Elmira,	Science and Letters
Merritt, Ernest George,	Indianapolis, Ind.,	Elect. Eng.

Meyer, Rachel,	<i>Ithaca,</i>	Philosophy
Mooney, Margaret Elizabeth,	<i>Ithaca,</i>	Science and Letters
Nef, John Jacob,	<i>Housatonic, Mass.,</i>	Mech. Arts
Nourse, Sarah Cornelia,	<i>Ithaca,</i>	Science and Letters
Olin, Franklin Walter,	<i>Buskirk's Bridge,</i>	Optional
Packard, Allyn Augustus,	<i>St. Louis, Mo.,</i>	Architecture
Paddock, Anna Maria,	<i>Auburn,</i>	Philosophy
Patterson, Webster,	<i>Wilmington, Del.,</i>	Mech. Arts
Pearce, Otis Ezra,	<i>North Hannibal,</i>	Natural Hist.
Perkins, Albertus Delos,	<i>Little York,</i>	Arts
Pierce, George Henry,	<i>Branchport,</i>	Architecture
Raichle, Frank Godfrey,	<i>Buffalo,</i>	Electrical Engineering
Ransom, Charles Wellington,	<i>Ellensburg,</i>	Science and Letters
Rider, Ora Putnam,	<i>Parish,</i>	Philosophy
Riley, William Hermon,	<i>Wilmington, Del.,</i>	Mech. Arts
Romney, Joseph MacAuslin,	<i>Salt Lake City, Utah,</i>	Sc. & Let.
Russell, Isaac Howard,	<i>Castile,</i>	Philosophy
Rutledge, Arthur,	<i>Rockford, Ill.,</i>	Civil Engineering
Ryder, Stephen,	<i>Carmel,</i>	Elect. Engineering
Sackett, John Thomas,	<i>Brooklyn,</i>	Science and Letters
Sage, Adolphus Hiram,	<i>South New Berlin,</i>	Sci. and Let.
Schlesinger, Mark Mayer,	<i>New York City,</i>	Sc. and Letters
Seymour, John Pliny,	<i>Ogdensburg,</i>	Science and Letters
Shepard, Frank William,	<i>Medina, O.,</i>	Civil Engineering
Smith, Eva Anna,	<i>West Winfield,</i>	Sc. and Letters
Sprague, Danly Darius, Jr.,	<i>Holley,</i>	Civil Engineering
Stoner, Stanley,	<i>Griggsville, Ill.,</i>	Sc. and Letters
Story, Charles Butts,	<i>Schultzville,</i>	Science and Letters
Summers, Henry Elijah,	<i>Rochester,</i>	Natural History
Sweet, Joseph Ferris,	<i>Throop,</i>	Philosophy
Taylor, Hobart Chatfield,	<i>Chicago, Ill.,</i>	Sc. and Letters
Thurber, Charles Herbert,	<i>Deckertown, N. J.,</i>	Philosophy
Towl, Forrest Milton,	<i>Elmira,</i>	Optional
Tyler, Edward,	<i>Ithaca,</i>	Optional
Upton, Wallace Lincoln,	<i>Clymer,</i>	Electrical Engineering
Veiga, Saturnino Ferreira da, Jr.,	<i>Rio Janeiro, Brazil,</i>	Civil Eng.
Wheeler, Amos,	<i>Ithaca,</i>	Philosophy
White, Charles David,	<i>Marion,</i>	Natural History
Wightman, Edward Daniel,	<i>Eden,</i>	Mathematics

Wing, Charles Benjamin,	<i>Willow Brook,</i>	Civil Eng.
Wood, Phœbe Jane,	<i>Portville,</i>	Science and Letters
Yawger, John Francis,	<i>Union Springs,</i>	Science and Let.

## SOPHOMORES.

Allendorf, Elbert James,	<i>Poughkeepsie,</i>	Philosophy
Alexander, Charles Doster,	<i>Prattville, Ala.,</i>	Optional
Alvord, Lucy,	<i>Johnstown,</i>	Arts
Aspinwall, John Judson,	<i>Troy, Pa.,</i>	Civil Engineering
Barton, Lyman Guy,	<i>Willsborough,</i>	Mechanic Arts
Bellinger, Lyle Fred,	<i>Ilion,</i>	Civil Engineering
Bennett, De Villo Levi,	<i>Wellington, Ohio,</i>	Elect. Eng.
Bishop, Robert Hallam,	<i>Trumbull's Corners,</i>	Philosophy
Bodine, Donaldson,	<i>Lodi,</i>	Optional
Boynton, Edward Carlisle, Jr.,	<i>Newburg,</i>	Mechanic Arts
Brill, Gerow Dodge,	<i>Poquog,</i>	Agriculture
Browning, Charles, Jr.,	<i>Chatham,</i>	Mechanic Arts
Brunk, Thomas Lafayette,	<i>Ottawa, Ill.,</i>	Agriculture
Burr, Lucius Franklin,	<i>St. Johnsville,</i>	Sc. and Letters
Byrne, Sarah,	<i>Edgewood, Ill.,</i>	Optional
Carr, Henry Low,	<i>Paterson, N. J.,</i>	Med. Prep.
Casey, George Whitman,	<i>Auburn,</i>	Architecture
Champion, Edward Willet,	<i>Goshen,</i>	Science and Letters
Chrisman, Francis Leon,	<i>Harrisburg, Pa.,</i>	Hist. & Pol. Sc.
Coar, Thomas Edward,	<i>New York City,</i>	Arts
Cohn, Morris, Jr.,	<i>Cobleskill,</i>	Science and Letters
Coley, Harrison,	<i>New Woodstock,</i>	Sc. and Letters
Colnon, Redmond Stephen,	<i>Potsdam,</i>	Civil Engineering
Coray, George Quincy,	<i>Provo City, Utah,</i>	Optional
Cornell, Ezra,	<i>Ithaca,</i>	Optional
Corser, Helen Henrietta,	<i>Minneapolis, Minn.,</i>	Optional
Covell, Grant,	<i>Springfield, Pa.,</i>	Mechanic Arts
Coville, Frederic Vernon,	<i>Oxford,</i>	Arts
Cox, James Lincoln,	<i>Norwich,</i>	Mechanic Arts



Curtis, Charles William,  
 Cutter, William Parker,  
 Dennis, John Bartlett,  
 Dimon, Henry Goldsmith,  
 Doud, Eli Horace,  
 Durand, Fred Coxe,  
 Elliott, Elias Leavenworth,  
 Everitt, John Elmer,  
 Fergusson, Mark,  
 Flint, Rufus,  
 Franklin, Frank George,  
 Gerrish, William Blanchard,  
 Gifford, Arthur Warner,  
 Gillis, William Davis,  
 Gilmore, Victor Lee,  
 Goodkind, Martin Henry,  
 Greenawalt, William Eckert,  
 Gray, Macomb Byron,  
 Gray, William Emory,  
 Gunner, Daniel Webster,  
 Harrison, Joseph La Roy,  
 Hart, Emmet Ellsworth,  
 Hays, Harry Thomas,  
 Hebard, Fred Whitmore,  
 Hebbard, William Sterling,  
 Hedden, Edward,  
 Himes, Albert James,  
 Holman, Sidney Smith,  
 Horr, Charles William,  
 Hungerford, Mary Gavina,  
 Jaggard, Arthur Monroe,  
 Jenkins, Ralph,  
 Jones, Clinton Irving,  
 Keating, Langford Spencer,  
 Kelsey, Sidney Eugene,  
 Kuykendall, Benjamin, Jr.,  
 Laney, Lydia Hunt,  
 Lawrence, Theodorè Finch,  
 Lemcke, John Frederick,

*Washington, D. C.*, Civil Eng.  
*Washington, D. C.*, Anal. Chem.  
*Gardiner, Me.*, Optional  
*Riverhead*, Civil Engineering  
*Chicago, Ill.*, Literature  
*Westfield*, Civil Engineering  
*Glenora*, Chemistry and Physics  
*Burlington, Pa.*, Medical Prep.  
*Brooklyn*, Civil Engineering  
*Rivas, Nicaragua*, Mech. Arts  
*Plover, Wis.*, Optional  
*Oberlin, O.*, Civil Engineering  
*Little Utica*, Architecture  
*Kinsman, Ohio*, Mechanic Arts  
*New Iberia, La.*, Agriculture  
*New York City*, Optional  
*Silver Spring, Pa.*, Civil Eng.  
*Cape Vincent*, Sc. and Letters  
*Williamsport, Pa.*, Mech. Arts  
*Schaghticoke*, Civil Engineering  
*North Adams, Mass.*, Sc. and Let.  
*Little Valley*, Civil Engineering  
*Decatur, Ill.*, Sc. and Letters  
*Woodville*, History and Pol. Sci.  
*Rochester*, Architecture  
*Ithaca*, Civil Engineering  
*Oswego*, Civil Engineering  
*Boston, Mass.*, Mechanic Arts  
*Wellington, Ohio*, Sc. and Let.  
*Ithaca*, Optional  
*Altoona, Pa.*, Optional  
*Newburg*, Medical Preparatory  
*Groton*, Optional  
*Buffalo*, Science and Letters  
*Stockholm Depot*, Civil Eng.  
*Towanda, Pa.*, Optional  
*Waterloo*, Philosophy  
*Chester*, Civil Engineering  
*Cedar Grove, N. J.*, Med. Prep.

Lent, Albert Swift,	Wellsboro, Pa.,	Optional
Lockwood, William Augustus,	Fairport,	Agriculture
Lovell, Herbert Marlow,	Ithaca,	Optional
Maguire, Patrick James,	Chateaugay,	Civil Engineering
Marshall, George Montanye,	Towanda, Pa.,	Philosophy
Mattison, John Albert,	Sand Bank,	Science and Letters
McCargo, Grant,	Pittsburgh, Pa.,	Anal. Chem.
McCulloch, Robert Lawton,	Stevens' Point, Wis.,	Optional
Mechan, John William,	Fairport,	Civil Engineering
Meloy, Fredrika Williams,	Portville,	Optional
Miller, George Congdon,	Elmira,	Science and Letters
Moore, Frank Mercedith,	Syracuse,	Hist. and Pol. Science
Moore, Veranus Alva,	Parish,	Science and Letters
Mulford, Augusta Louisa,	East Orange, N. J.,	Nat. History
Nettleton, James Burritt,	Medina, Ohio,	Architecture
Newton, Frank Merrick,	Homer,	Optional
Norton, Albert Julius,	Utica,	Architecture
Norton, George Harvey,	East Pembroke,	Civil Eng.
Olmstead, Edward,	Waverly,	Medical Preparatory
Otis, Lois Macy,	Sherwood,	Science and Letters
Oviatt, Bordman Lambert,	Shushan,	Medical Preparatory
Oviatt, David Brainerd,	Shushan,	Mechanic Arts
Perkins, Ella Gertrude,	Addison Hill,	Optional
Potter, Grant,	Ithaca,	Mechanic Arts
Proctor, Alfred Stainbank,	Denver, Col.,	Civil Engineering
Richards, George Blackwell,	Leavenworth, Kansas,	Sc. & Let.
Roberts, Perry Buchanan,	Ithaca,	Hist. and Pol. Science
Runner, Emma Avaline,	Ithaca,	Science and Letters
Russell, James Earl,	Hamden,	Arts
Rutherford, Robert Elmer,	Binghamton,	Optional
Ryan, Harris Joseph,	Halifax, Pa.,	Electrical Eng.
Ryther, George De Groot,	Carthage,	Mechanic Arts
Saal, George Frederick,	Cleveland, Ohio,	Optional
St. John, Richard Collier,	St. Catharine's, Canada,	Civil Eng.
Sargent, Eric Hoxsie,	Medina, Ohio,	Optional
Sclmser, Kate Eveline,	Waterloo,	Literature
Sheldon, Morris Woodworth,	Hornellsville,	Chem. and Physics
Smith, Edward Leroy,	Binghamton,	Science and Let.
Smith, Harry Ezra,	Pike,	Mechanic Arts

Smith, Milton,	<i>Ellenville,</i>	Optional
Smith, Wayland Hyatt,	<i>Philadelphia, Pa.,</i>	His. & Pol.Sc.
Stanbrough, Lyman Truman,	<i>Owego,</i>	Science and Letters
Stedman, John Moore,	<i>Brockport,</i>	Natural History
Sterling, Guy,	<i>Gambier, O.,</i>	Civil Engineering
Stewart, Neil, Jr.,	<i>York,</i>	Civil Engineering
Stone, Frank Elmer,	<i>Livonia,</i>	Civil Engineering
Sweet, Robert Vaughn,	<i>Throop,</i>	Medical Preparatory
Taylor, John Waring,	<i>Corinth, Miss.,</i>	Sc. and Letters
Thomson, Fred William,	<i>Alexandria Bay,</i>	His. & Pol. Sc.
Thomson, John Fuller,	<i>Alexandria Bay,</i>	Sc. and Let.
Tomlinson, Thomas Wilbur,	<i>Logansport, Ind.,</i>	Optional
Turnbull, Thomas, Jr.,	<i>Syracuse,</i>	Medical Preparatory
Vedder, Herman Klock,	<i>St. Johnsville,</i>	Civil Engineering
Warner, Albert Rollin,	<i>Wellington, Ohio,</i>	Sc. and Let.
Weber, George Frederick,	<i>Lysander,</i>	Science and Letters
Wheeler, Fred Russell,	<i>Buffalo,</i>	Hist. and Pol. Science
Wheeler, Metellus Clinton Woodbury,	<i>Peoria, Ill.,</i>	Mechanic Arts
White, Horace,	<i>Syracuse,</i>	Science and Letters
Wilbur, Royal Edwards,	<i>Carthage,</i>	Hist. and Pol. Science
Wilkinson, Theodore Kirkland,	<i>Syracuse,</i>	Philosophy
Willard, Frederick Bush,	<i>Geneseo,</i>	Optional
Williams, Chauncey Grant,	<i>Ithaca,</i>	Civil Engineering
Williams, Otis Lincoln,	<i>Ithaca,</i>	Electrical Engineering
Wilson, James Fountain,	<i>Menomonee, Wis.,</i>	His. & Pol. Sc.
Wright, Ellsworth David,	<i>Ithaca,</i>	Arts



## FRESHMEN.

Aldrich, Byron Seymour,	<i>Port Byron,</i>	Optional
Allen, Lucian Crandall,	<i>Whitesville,</i>	Civil Engineering
Antisdale, George Perez,	<i>Nyack,</i>	Natural History
Barnes, Edward Bradford,	<i>Corning,</i>	Science and Letters
Barnum, Merritt Wright,	<i>Chappaqua,</i>	Natural History
Barros, Bento de,	<i>S. Paulo, Brazil,</i>	Agriculture
Battin, John Wilson,	<i>Albany,</i>	Philosophy
Beardsley, Jessie May,	<i>Ithaca,</i>	Architecture
Beardsley, Lewis Aurelius,	<i>Ithaca,</i>	History and Pol. Science
Beauchamp, Howard Carter,	<i>Baldwinsville,</i>	Science and Let.
Becker, Charton Lansing,	<i>Philadelphia,</i>	Civil Engineering
Benson, Orville,	<i>Sharon, Ct.,</i>	Civil Engineering
Berrigan, William Joseph,	<i>Sandy Hill,</i>	Science and Letters
Best, Lyman Austin,	<i>Hornellsville,</i>	Civil Engineering
Bissell, George Welton,	<i>Poughkeepsie,</i>	Mechanic Arts
Blood, Bryant Harmon,	<i>Ludlow, Pa.,</i>	Elect. Engineering
Blood, Charles Hazen,	<i>Ithaca,</i>	Philosophy
Bostwick, William Herbert,	<i>Ithaca,</i>	Science and Letters
Boult, Ella Maud,	<i>Medina, O.,</i>	Optional
Brace, James Frederick,	<i>Leavenworth, Kansas,</i>	Optional
Brasser, Jacob,	<i>East Williamson,</i>	Optional
Briesen, Julius von, Jr.,	<i>New York City,</i>	Civil Eng.
Bristol, Carrie Louise,	<i>West Sand Lake,</i>	Sc. and Let.
Broadwell, Frank Adoniram,	<i>Morrisonville,</i>	Civil Engineering
Bronson, Hiram Sherman,	<i>Marquette, Mich.,</i>	Civil Eng.
Brooks, Harry Niemeyer,	<i>Brooklyn,</i>	Mechanic Arts
Brown, Pierre Marshall,	<i>Hempstead,</i>	Civil Engineering
Brunn, Adeline Eve,	<i>Buffalo,</i>	Optional
Burnett, Archie Collamer,	<i>Waterloo,</i>	Optional
Carpenter, Charles Edwin,	<i>Big Flats,</i>	Science and Letters
Case, Josiah Corwin,	<i>Peconie,</i>	Electrical Engineering
Chamberlain, Joseph Redington,	<i>Kanona,</i>	Science and Letters
Clancy, John Scott,	<i>Hornellsville,</i>	Civil Engineering
Clark, Harry Willard,	<i>N. Andover, Mass.,</i>	Anal. Chem.
Clock, Fred Leland,	<i>Ithaca,</i>	Civil Engineering
Cole, Byron Gray,	<i>Ithaca,</i>	Medical Preparatory
Coles, Howard Lawrence,	<i>New Rochelle,</i>	Sc. and Letters



Colt, Bertha Napier,	<i>Medina, O.,</i>	Optional
Cooling, William Lowrey,	<i>Wilmington, Del.,</i>	Civil Eng.
Cooper, William,	<i>Evans' Mills,</i>	Mechanic Arts
Cornell, Arthur Leland,	<i>Albany,</i>	Optional
Crossinan, George Seth,	<i>Brushton,</i>	Agriculture
Crossman, Stephen Henry,	<i>Brushton,</i>	Agriculture
Crittenden, Fred King,	<i>Ithaca,</i>	Civil Engineering
Daugherty, Lawrence Lumaree,	<i>Wabash, Ind.,</i>	Optional
Day, James Hallack, Jr.,	<i>Saybrook, Ct.,</i>	Optional
Dibble, Arthur Jackson,	<i>Franklin,</i>	Optional
Dickinson, Mellville Day,	<i>Seward,</i>	Science and Letters
Dillenbeck, Clark,	<i>Palatine Bridge,</i>	Civil Eng.
Disney, Irvin Porter,	<i>Baltimore, Md.,</i>	Electrical Eng.
Dix, Charles Billinger,	<i>Glens Falls,</i>	Mechanic Arts
Dolson, Edward,	<i>Bath,</i>	Science and Letters
Donaldson, George,	<i>Gilbertsville,</i>	Optional
Driscoll, William Maurice,	<i>Ithaca,</i>	Mechanic Arts
Duffies, Edward John,	<i>Markeson, Wis.,</i>	Civil Eng.
Earll, Lottie Irene,	<i>Syracuse,</i>	Arts
Edgerton, Charles Rollin,	<i>Little Rock, Ark.,</i>	Architecture
Edwards, James Harvey,	<i>Oxford,</i>	Civil Engineering
Emmons, Charles Morton,	<i>Huron,</i>	Civil Engineering
Epps, Orlo,	<i>Oneonta,</i>	Optional
Farling, Montgomery,	<i>Ithaca,</i>	Agriculture
Farrington, William Sherman,	<i>Jacksonville,</i>	Civil Engineering
Fisher, Henry Wright,	<i>Dymond City, N. C.,</i>	Elect. Eng.
Fisher, John Arthur,	<i>Ithaca,</i>	Science and Letters
Fisher, William Clark,	<i>Westerlo,</i>	Arts
Fitch, Winchester,	<i>Jefferson, O.,</i>	Sc. and Letters
Foster, Lottie,	<i>Ithaca,</i>	Literature
Fowler, Charles Sumner,	<i>Gouverneur,</i>	Arts
France, Gertrude Gladys,	<i>Skaneateles,</i>	Arts
Fukuzawa, Ichitaro,	<i>Tokio, Japan,</i>	Agriculture
Fulkerson, Joseph Chapman,	<i>Dryden,</i>	Mechanic Arts
Gaar, Jonas,	<i>Richmond, Ind.,</i>	Civil Eng.
Gans, John Lyons,	<i>Morris Cross Roads, Pa.,</i>	Civil Eng.
Gibson, George Harry,	<i>Peoria, Ill.,</i>	Analytical Chem.
Gilman, Frank Gaylord,	<i>Sherburne,</i>	Literature
Glasser, Charles Harry,	<i>Mineville,</i>	Mechanic Arts

Gleason, Kate,	Rochester,	Mechanic Arts
Glover, John Irving,	New Orleans, La.,	Architecture
Goetter, Leon Joseph,	Montgomery, Ala.,	Sc. and Let.
Green, Charles Newton,	Batavia,	Civil Engineeering
Groves, Albert Bartleton,	Rome,	Architecture
Hall, Fanny Sarah Crossett,	Ithaca,	Medical Preparatory
Hall, Halliette Deraxa Ellis,	Ithaca,	Optional
Hall, Lorenzo Thomas,	Wyanett, Ill.,	Civil Engineering
Hamant, Irving,	Groutville, Ct.,	Medical Prep.
Hampton, Willis Herbert,	Dansville,	Electrical Eng.
Harris, William Mason,	Owego,	Optional
Hasbrouek, Alvah Deyo,	Highlands,	Civil Engineering
Heath, Henry Edward,	Thomaston, Ct.,	Mechanic Arts
Hegcwald, Arthur Frederick,	New Albany, Ind.,	Mech. Arts
Heller, David Neish,	Elmira,	Science and Letters
Heller, Michel Burt,	Elmira,	Seicnce and Letters
Henderson, Eliot Middleton,	Washington, D. C.,	Mech. Arts
Hersey, Theodore,	Montreal, Canada,	Mech. Arts
Higgins, George Edwin,	Memphis,	Civil Engineering
Hopkins, Jesse James,	Churchville,	Mechanic Arts
Hough, Abraham Lincoln,	Lowville,	Seiencce and Letters
Houghton, Collins,	Carthage,	Civil Engineering
Howes, James Thomas,	Utica,	Arts
Hoyt, George Frederiek Gladding,	Brooklyn,	Civil Engineering
Hull, Mary Josephine,	Ithaca,	Philosophy
Hyatt, John Sherwood,	Troy,	Civil Engineering
Iekelheimer, Henry Rubens,	New York City,	Sc. and Letters
Johnson, George Augustus,	Youngstown, O.,	Mechanic Arts
Johnson, Harry George,	Elmira,	Civil Engineering
Jones, Forest Robert,	Sharon, O.,	Meehanic Arts
Jones, Julio,	Sacour, U. S. Col.,	Civil Eng.
Jones, Sebastian Chatham,	Aurora,	Elect. Engineering
Kammann, Will Theodore,	Dubuque, Iowa,	Elect. Eng.
Kennedy, Frank Gallop,	Oneida,	Chem. and Physies
King, Stephen Trowbridge,	Chicago, Ill.,	Optional
King, Warren Phelps,	Ithaca,	Architecture
Kinkaid, Charles Flint,	Eureka Springs, Ark.,	Eleet. Eng.
Kuhns, Aaron Henry,	Greensburg, Pa.,	Civil Eng.
Lathrop, Henry Burrowes,	Walla Walla, W. T.,	Arts

Leonard, James Augustus,	<i>Newburg,</i>	Architecture
Lewis, Fred Nelson,	<i>Herkimer,</i>	Optional
Linen, George Griffith,	<i>Buffalo,</i>	Mechanic Arts
Lorber, Frederic Auguste,	<i>Ithaca,</i>	Science and Letters
Lord, Frank Stone,	<i>Mendon,</i>	Optional
Loomis, Clarence Edward,	<i>Oneida,</i>	Electrical Engineering
Lougee, Mary Williamina,	<i>West Roxbury, Mass.,</i>	Sc. & Let.
Lowman, Ulysses Mercur,	<i>Wellsburg,</i>	Science and Letters
Ludwig, John Lawrence,	<i>Richmond, Va.,</i>	Mechanic Arts
Lynde, Arthur Lincoln,	<i>Antwerp,</i>	Agriculture
Macomber, Irwin John,	<i>Watertown,</i>	Electrical Eng.
McAllister, Charles Albert,	<i>City Island,</i>	Mechanic Arts
Marx, Stephanie,	<i>Toledo, O.,</i>	Science and Letters
Maxwell, William Sampson,	<i>Brooklyn,</i>	Civil Engineering
Mead, Winslow Morrison,	<i>Richmond, O.,</i>	Optional
Menocal, Adolfo Joseph,	<i>Havana, Cuba,</i>	Civil Eng.
Menocal, Mario Garcia,	<i>Havana, Cuba,</i>	Civil Eng.
Metzger, Albert Elbracht,	<i>Indianapolis, Ind.,</i>	Sc. and Let.
Millard, John Roosa,	<i>Kingston,</i>	Mechanic Arts
Miller, Ransford Stevens, Jr.,	<i>Ithaca,</i>	Arts
Miller, Theodore,	<i>Antwerp,</i>	Hist. and Pol. Science
Molitor, Frederic Albert,	<i>New York City,</i>	Civil Eng.
Mossdrop, William Addams,	<i>Brooklyn,</i>	Electrical Eng.
Munger, George Grover,	<i>Ithaca,</i>	Arts
Nathan, Alfred,	<i>New York City,</i>	Mechanic Arts
Neale, Charles Thompson, Jr.,	<i>Pittsburg, Pa.,</i>	Optional
Newberry, Robert Thorne,	<i>New York City,</i>	Architecture
Noyes, Walter Chadwick,	<i>Lyme Ct.,</i>	Optional
Nye, Algernon Sidney,	<i>Watkins,</i>	Civil Engineering
O'Toole, James,	<i>Waterville,</i>	Science and Letters
Page, Erford Lydell,	<i>Whitney's Point,</i>	Elect. Eng.
Page, Murray Esek,	<i>Bath,</i>	Mechanic Arts
Parmeter, George Cox,	<i>Hammond,</i>	Architecture
Parshall, Horace Field,	<i>Milford,</i>	Electrical Engineering
Parshall, William Worthington,	<i>Uniontown, Pa.,</i>	Optional
Pearson, Leonard,	<i>Ithaca,</i>	Agriculture
Pelton, Gilbert Brace,	<i>Ilion,</i>	Optional
Pfau, William Henry,	<i>Hamilton, O.,</i>	Architecture
Phillips, Albert,	<i>Newark, N. J.,</i>	Optional



Pickard, Jay Eugene,	Fort Plain,	Optional
Pitcher, Fred Byron,	Adams,	Civil Engineering
Potter, Edwin Stanton,	Wellsboro, Pa.,	Sc. and Letters
Preston, George Benton,	Corning,	Mechanic Arts
Psotta, Charles Ludwig George,	Philadelphia, Pa.,	Elect. Eng.
Psotta, Louis Frederic,	Philadelphia, Pa.,	Elect. Eng.
Puterbaugh, Walter Leslie,	Peoria, Ill.,	Mechanic Arts
Puyana, Manuel Maria,	Buearamanega, U. S. C.,	Agri.
Quincey, George Adams,	Pittsburg, Pa.,	Electrical Eng.
Randall, Norman Benjamin,	Stockport,	Mechanic Arts
Read, Willette Warren,	Watertown,	Civil Engineering
Roess, Henry Christian,	South Oil City, Pa.,	Hist. & Pol. Sc.
Rogers, Agnes Adelaide,	Rochester,	Science and Letters
Romer, William Johnstone,	Ithaca,	Hist. and Pol. Science
Rowlee, Willard Winfield,	Fulton,	Science and Letters
Ruyter, George Arlin,	North Grosvenor, Ct.,	Optional
Sanford, Esther Marion,	Marion,	Arts
Sanford, John Wheeler,	Warwick,	Agriculture
Sawyer, William Herbert,	Watertown,	Civil Engineering
Scaife, James Verner,	Alleghany City, Pa.,	Science
Schreiner, John Charles, Jr.,	Alleghany City, Pa.,	Arch.
Schwalbach, Frank,	Menosha, Wis.,	Civil Eng
Scott, Jacob Charles Edward,	Albany,	Philosophy
Scribner, Erwin Earnest Eliphalet,	Scriba,	Science and Letters
Shannon, Thomas,	Bath,	Science and Letters
Shattuck, George Henry, Jr.,	Medina,	Architecture
Sheldon, LeRoy Gray,	Gouverneur,	Agriculture
Shepard, Fred Harry,	Clyde,	Optional
Silliman, Joseph Warren,	Ashtabula, O.,	Optional
Simpson, Peter Brennan,	Newport, R. I.,	Optional
Sisco, Louis,	Baldwinsville,	Civil Eng.
Smith, Adeltus Ervin,	Manchester Centre,	Optional
Snow, Julia Warner,	La Salle, Ill.,	Science
Soulé, Albert Lee,	New Orleans, La.,	Sc. and Let.
Soulé, Edward Everett,	New Orleans, La.,	Sc. and Let.
Spencer, Andrew,	Milford,	Science and Letters
Springer, Philip Güttingen,	Columbus, Ga.,	Mechanic Arts
Squier, Wallace Carlton,	Stanley,	Optional
Stanbrough, Frank Truman,	Owego,	Optional



Staunton, Frederick Marshall,	<i>Charleston, W. Va.,</i> Civil Eng.
Steele, Samuel Weirner,	<i>Greensburg, Pa.,</i> Sc. and Let.
Stephens, George Washington,	<i>Tarrytown,</i> Mechanic Arts
Sternberger, Edwin,	<i>New York City,</i> Sc. and Let.
Stockbridge, William Morse,	<i>Washington, D. C.,</i> Science
Stone, Walter Hitchcock,	<i>Sandusky, O.,</i> Science and Let.
Stratton, William Buck,	<i>Elmira,</i> Architecture
Stratton, William Henry,	<i>Circleville, O.,</i> Civil Engineering
Strong, Susan Caroline,	<i>Owego,</i> Arts
Stuart, Charles Willetts,	<i>Skaneateles,</i> Science and Let.
Sullivan, John,	<i>Fisher's,</i> Civil Engineering
Tansey, George Judd,	<i>St. Louis, Mo.,</i> Optional
Taylor, Harry Leonard,	<i>Ithaca,</i> Arts
Taylor, John Myers,	<i>Albany,</i> Civil Engineering
Thorn, Seward Thomas,	<i>Clyde,</i> Science and Letters
Titus, George Herbert,	<i>Harpersfield,</i> Arts
Treat, Harry Whitney,	<i>Monroe, Wis.,</i> Optional
Tuthill, Victor Maxwell,	<i>Dowagiac, Mich.,</i> Philosophy
Tuttle, Edwin Johns,	<i>Wellsboro, Pa.,</i> Civil Eng.
Twining, William Stanton,	<i>Union City, Pa.,</i> Mech. Arts
Ulrich, Russell,	<i>Hyde Park, Ill.,</i> Civil Eng.
Van Valkenburg, Edwin Augustus,	<i>Wellsboro, Pa.,</i> Sc. and Let.
Vedder, Wellington Romeyn,	<i>Leeds,</i> Civil Engineering
Wallenbeck, Edward Thomas,	<i>Willow Creek,</i> Mech. Arts
Walter, Arthur Leslie,	<i>Whitney's Point,</i> Mech. Arts
Walton, William Hickman.	<i>Buffalo,</i> Mechanic Arts
Wardwell, Mary Margaretta,	<i>Buffalo,</i> Architecture
Webster, Milo Freeman,	<i>Victor,</i> Natural History
Weeks, George Rufus,	<i>Clyde,</i> Optional
White, Andrew Strong,	<i>Syracuse,</i> Science and Letters
White, George Reeves,	<i>Southampton,</i> Sc. and Letters
Widman, Mary Anna,	<i>Freeport, Ill.,</i> Philosophy
Wilder, Kitty Mary,	<i>Medina,</i> Optional
Williams, William,	<i>Groton,</i> Civil Engineering
Wilson, Benjamin Lee,	<i>Newark, O.,</i> Optional
Winters, Charles Sylvester,	<i>Binghamton,</i> Arts
Wixom, Fred Charles,	<i>Starkey,</i> Optional
Woolner, Samuel,	<i>Peoria, Ill.,</i> Anal. Chemistry
Wyckoff, Richard Tuttle,	<i>Perry,</i> Science

## SPECIAL STUDENTS.

(See page 45.)

Arnoldt, Julius William,	<i>Rochester,</i>	Architecture
Bausch, Henry,	<i>Rochester,</i>	Mechanic Arts
Bruce, Edward Malcolm,	<i>Aurora, Ill.,</i>	Chem. and Physics
Cable, Frank,	<i>Cleveland, O.,</i>	Mechanic Arts
Coffin, Lawrence,	<i>Nantucket, Mass.,</i>	Phys. & Chem.
Cooper, Walden Harte,	<i>Titusville, Pa.,</i>	Mechanic Arts
Eldredge, Alfred Henry,	<i>Watertown,</i>	Mechanic Arts
Flynn, Henry,	<i>Leavenworth, Kan.,</i>	Mech. Arts
Gregor, Frances,	<i>Ahnapee, Wis.,</i>	Literature
Hart, John Battelle,	<i>Clarksburg, W. Va.,</i>	Mech. Arts
Hippely, Edward,	<i>Erie, Pa.,</i>	Mechanic Arts
Howe, John Baker,	<i>Ithaca,</i>	Chemistry
Jones, Maurice Frederick,	<i>Sterlington,</i>	Analytical Chem.
King, Herman Clark,	<i>Willow Creek,</i>	Agriculture
Maddocks, William,	<i>Stafford, England,</i>	Mech. Arts
Quin, Thomas Francis,	<i>Buffalo,</i>	Mechanic Arts
Sanford, Edward Burt,	<i>Warwick,</i>	Agriculture
Siemens, George Mellin,	<i>St. Joseph, Mo.,</i>	Architecture
Simpson, Harold Granger,	<i>Columbus, O.,</i>	Hist. & Pol. Sci.
Tenny, Henry Allen,	<i>Worcester, Mass.,</i>	Hist. & Pol. Sc.
Vick, Henry,	<i>Rochester,</i>	Mechanic Arts

## SUMMARY OF RESIDENT STUDENTS.

RESIDENT GRADUATES, including FELLOWS, . . . . .	29
Seniors, . . . . .	59
Juniors, . . . . .	89
Sophomores, . . . . .	133
Freshmen, . . . . .	232
Special Students, . . . . .	21
Total Undergraduates, . . . . .	534
Total in the University, . . . . .	563

SUMMARY OF GRADUATES SINCE THE UNIVERSITY  
OPENED, OCTOBER, 1868.

BACHELORS—Arts, . . . . .	146
Literature, . . . . .	45
Philosophy, . . . . .	73
in History and Political Science, . . . . .	8
Science, before the division of the course, . . . . .	187
Science and Letters, since the division, . . . . .	169
Chemistry and Physics, . . . . .	18
Natural History, . . . . .	24
Physical Science, . . . . .	8
Mathematics, . . . . .	4
Civil Engineering, . . . . .	2
Agriculture, . . . . .	28
Architecture, . . . . .	37
Civil Engineering, . . . . .	152
Mechanical Engineering, . . . . .	54
Veterinary Science, . . . . .	3
Total, (deducting seven for having taken two degrees, 1 A. B.; 1 Ph. B.; 1 Agr. B.; 2 Arch. B.; and 2 B. C. E.), . . . . .	958

SECOND DEGREES—Masters of Science, . . . . .	19
Masters of Arts, . . . . .	13
Doctors of Philosophy, . . . . .	6
Civil Engineers, . . . . .	20
Architects, . . . . .	1
Mechanical Engineers, . . . . .	1
Doctor of Veterinary Medicine, . . . . .	1
LICENTIATE CERTIFICATES, . . . . .	19
CERTIFICATES OF PROFICIENCY, . . . . .	7



# ADMISSION AND CLASSIFICATION.

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## CONDITIONS OF ADMISSION.

Candidates must be of good moral character and at least *sixteen* years of age, or, if women, *seventeen*.

Candidates for admission must obtain permits for examination at the Registrar's office, and the results of the examinations may be ascertained from the Registrar.

## ENTRANCE EXAMINATIONS.

Examinations in all the subjects required for admission to the University are held *three* times in the year, as follows: 1. In June, at the end of the Spring term, Monday, Tuesday and Wednesday preceding Commencement Day. 2. In September, at the beginning of the Fall term. 3. In January, at the beginning of the Winter term. The days will be found indicated in the Calendar. Special examinations of candidates for admission can be held at other times only by permission of the Faculty.

### I. THE PRIMARY OR ENGLISH ENTRANCE EXAMINATIONS.

All candidates for admission, except those provided with certificates or diplomas as specified below, are examined as follows:

1. In *English Grammar*; Whitney's *Essentials of English Grammar* is the standard. A short composition is required as a test of the candidate's knowledge of spelling, punctuation, the use of capitals, and elementary English construction.

If the candidate prefers, the subject for this composition will be assigned by the examiner from one of the books named below, and the knowledge of the subject matter shown will be duly regarded.

In 1885: Shakespeare's *Merchant of Venice*, Scott's *Lady of the Lake*, Hawthorne's *Twice-Told Tales*, Lowell's *Vision of Sir Launfal*.

2. In *Geography*, political and physical; as much as is contained in Harper's *School Geography*, or in Warren's *Common school Geography*.

3. In *Physiology*; as presented in the smaller text-books upon the subject, exclusive of the nervous system and the names of bones and muscles.

4. In *Arithmetic*, including the metric system of weights and measures; as much as is contained in the larger text-books.

5. In *Plane Geometry*; as much as is contained in the first five books of Chauvenet's Treatise on Elementary Geometry, or in the first five books of Wentworth's Elements of Plane and Solid Geometry, or in the first six books of Newcomb's Elements of Geometry, or in the first six books of Hamblin Smith's Elements of Geometry.

6. In *Algebra*, through quadratic equations, and including radicals and the theory of exponents; as much as is contained in the first fourteen chapters of Loomis' Treatise on Algebra, or in Olney's Elementary Course in Algebra, or in the first five sections of Robinson's University Algebra, or in the first twenty-six chapters of Hamblin Smith's Elementary Algebra.

In Arithmetic, and in the fundamental operations of Algebra, such as multiplication and division, the management of brackets, the solving of numerical and literal equations of the first and second degrees, the combining and simplifying of fractions and radicals, the interpretation and use of negative quantities and of 0 and  $\infty$ , the putting of problems into equations—the student should have distinct notions of the meaning and the reason of all that he does, and be able to state them clearly in his own language; he should also be able to perform all these operations, even when somewhat complex, with rapidity, accuracy, and neatness; and to solve practical problems readily and completely. In his preparatory study he is advised to solve a great many problems, and to state and explain the reasons for the steps taken. In Geometry he should learn the definitions accurately, whether in the language of the text-book or not, and in proving a theorem or solving a problem he should be able to prove every statement made, and to go back step by step till he rests upon the primary definitions and axioms. He should be able to apply the principles of geometry to practical and numerical examples, to construct his diagrams readily with rule and compass, and to find for himself the solutions of simple problems and the demonstrations of simple theorems. Besides oral recitation, he is advised to write out his demonstrations, having equal regard to the matter and to the form of his statements; and when written he

may carefully study them to make sure, first, that he has a complete chain of argument, and, secondly, that it is so arranged that without defect or redundancy one step follows as a logical consequence of another.

These examinations are held in the following order:

*First Day.*—9 A. M., Arithmetic; 11 A. M., Geography; 3 P. M., English Grammar.

*Second Day.*—9 A. M., Plane Geometry; 11.30 A. M., Physiology; 2.30 P. M., Algebra through Quadratics.

In place of these examinations certain certificates or diplomas are received as follows:

1. *Certificates* issued by the *Regents of the University* of the State of New York are accepted in place of the examinations in English Grammar, Geography, and Arithmetic.

2. *Certificates* issued by the *Superintendent of Public Instruction* of the State of New York, and *Diplomas* issued by the State normal schools, and by those academies and high schools of the State of New York whose requirements for graduation have been approved by the Faculty, and whose course of study requires Physiology and Plane Geometry, are accepted in place of the examinations in all the subjects named above *except Algebra*.

3. *Diplomas* issued by the *Regents* to graduates from the high schools and academies of the State of New York are accepted in place of the examinations in all the subjects named above.

Optional students are admitted to the University upon passing the English Entrance or Primary Examinations; and for admission to the courses in *Agriculture, Architecture, Civil Engineering, Electrical Engineering, and Mechanic Arts*, only these Primary Examinations are required.

## II. EXAMINATIONS FOR ADMISSION TO THE OTHER COURSES.

For admission to any other of the regular courses of study examinations, *in addition to the Primary or English Entrance Examinations*, are required, as follows:

*To the Courses in Science, Science and Letters, Mathematics, Chemistry and Physics, and Analytical Chemistry:*

In addition to the English Entrance, an examination in *any one* of the following subjects:

1. In *French*, the principles of French Grammar, the translation of French at sight, the translation of English into French, and the equivalent of two of Bôcher's modern French plays and Lacombe's *Petite Histoire du Peuple Français*;



2. In *German*, the whole of Whitney's German Grammar, the translation of German at sight, the translation of English into German, and one hundred pages of Whitney's Reader, including two of the longer prose extracts or an equivalent;

Any deficiency in the preparatory French or German may be made up, as extra work, by reciting with the regular classes in the University.

Or the student may offer in *Mathematics*, Solid Geometry and Conic Sections, as much as is contained in Newcomb's Elements of Geometry; Advanced Algebra, as much as is contained in Olney's University Algebra, or in Newcomb's Algebra; and Trigonometry, Plane and Spherical, as much as is contained in Wheeler's Elements of Trigonometry, or in the unstarred portions of Oliver Wait and Jones' Treatise on Trigonometry.

*To the Course in Natural History:*

In addition to the Primary Examinations, as follows: 1. In *French* or *German*, as above. 2. In *Plane Trigonometry*. 3. In *Latin*, four books of Cæsar's Commentaries or an equivalent, with a good knowledge of the grammar. 4. In *Greek*, the alphabet and enough of the language to enable the student to recognize, analyze, and form scientific technical terms.

*To the Two-Year Course Preparatory to the Study of Medicine:*

In addition to the Primary Examinations, as follows: 1. In *Plane Trigonometry*, as above. 2. In *Latin*, as above. 3. In *Greek*, as above.

*To the Courses in Literature, Philosophy, and History and Political Science:*

In addition to the Primary or English Entrance Examinations, as follows: 1. In *French* or *German*, or *Mathematics*, as above. 2. In *Latin*, as below. 3. In *Grecian* and *Roman History* as below.

*To the Course in Arts:*

In addition to the Primary or English Entrance Examinations, as follows:

1. In *Greek*, candidates are expected to have read at least one hundred pages of Attic prose, and three books of Homer: they are examined (1) critically on what they have read; (2) in translating easy Greek at sight; and (3) in translating English into Greek.



2. In *Latin*, candidates are examined (1) in the following authors, with questions on subject-matter, constructions, and the formation and inflection of words: Cæsar, four books of the Gallic war, Virgil, the Eclogues and six books of the Æneid, with the prosody, Cicero, six Orations, including the four against Catiline; (2) in the translation at sight of passages of average difficulty from Cæsar and Cicero; and (3) in the translation into Latin of a piece of connected English based upon the principles and vocabulary contained in the first forty lessons of Allen's Introduction to Latin Composition.

3. In *Grecian and Roman History*, and the outlines of ancient geography; Fyffe's Primer of Greece, Creighton's Primer of Rome, and Tozer's Primer of Classical Geography will indicate the amount and method of study desired.

These additional examinations are held on the *third day*, as follows:

*Third Day*—8 A. M., Solid Geometry; 8 A. M., French; 9 A. M., Greek; 10.30 A. M., German; 10.30 A. M., Advanced Algebra; 2.30 P. M., Latin; 2.30 P. M., Trigonometry.

The examination in Grecian and Roman History is held at 8 A. M. on the *second day* of the examinations.

### ADMISSION WITHOUT EXAMINATION.

Any person at least twenty-one years of age, and having satisfactory attainments, may be admitted by vote of the Faculty, without examination, *as a Special Student*, on the recommendation of the professor in charge of any department in which he is to take a large part of his work. Such students cannot be candidates for a degree or a licentiate certificate; and their admission must be renewed every year.

### CANDIDATES FROM OTHER COLLEGES.

Certificates of honorable dismissal from other colleges are received in place of the *Primary Examinations*, when offered by candidates who *have passed at least one term's examinations* at the institution granting such dismissal. The dismissal does not admit the student to any special standing in the University, nor does it entitle him to enter upon advanced work in any study or department, without such examination as the professor in charge may think it necessary to give him.

## ASSIGNMENT TO CLASSES.

Every student who intends to complete any one of the four-year courses and graduate is assigned, on his admission to the University, to some one of the four annual classes; and no student will be allowed to pass from one to another of these classes until the work of the preceding year has been satisfactorily done.

Students who do not intend to complete any one of the four-year courses and graduate, are registered as "optional" in one of the four annual classes; but any student who has been registered as optional will be permitted to register in any one of the regular courses, on his completion of the work required for the standing which he proposes to take in that course.

## ADMISSION TO ADVANCED STANDING.

Any student who has had in another college, or elsewhere, an equivalent to one or more of the years of any of the regular courses may, on presenting evidence satisfactory to the Faculty of his ability to go on with the class he proposes to enter, be admitted provisionally to an advanced standing in that course, at his admission to the University. See page 49, "Graduation."

## ADMISSION TO RESIDENT GRADUATE STUDY.

Students are admitted to graduate study after having taken a baccalaureate degree in the University, or on presenting the diploma of an equivalent degree conferred elsewhere; they are at liberty to attend lectures, recitations, or other exercises of undergraduates, and to use the library, museums, etc. They are expected to pursue some study of advanced character under the direction of a professor or of a special faculty.

# RESIDENCE AND GRADUATION.

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## TERMS AND VACATIONS.

The academic year is divided into three terms, and there are three vacations.

Commencement comes on the third Thursday in June.

The Fall Term begins on the Tuesday following the thirteenth day of September, and ends on the Friday after the sixteenth day of December, making a term of thirteen weeks and four days.

The Winter Term begins on the Tuesday next after the second day of January; except when, in leap year, that Tuesday would be the third day of January, in which case it will begin on the Tuesday after the third.

The Spring vacation extends from the noon of the Friday next after the twenty-third of March until the second Saturday following.

The Spring Term begins on the second Saturday after the close of the Winter Term; the instruction begins on the Monday following, and continues until Commencement; making in all thirty-six weeks of term-time in the academic year.

The beginning and ending of terms and vacations of each year, and other matters of detail relating to them, may be found in the Calendar.

## REGISTRATION EACH TERM.

At the beginning of every term each student must obtain a Certificate of Registration before joining any class or attending any lectures; and no student, after having once been admitted to the University, will be allowed to register after the close of Registration Day, except on recommendation of the Committee on Absences, or by special permission of the Faculty.

## EXERCISES OF THE TERM.

A printed schedule of the University exercises is issued each term. Every student must take the equivalent of at least fifteen



hours of recitations a week, exclusive of military science and drill. Two and a half hours of laboratory work, or three hours of drafting or shop-work, are regarded as the equivalent of one recitation.

The regular examinations in all studies are held at the end of each term. Failure at examination entails forfeiture of position in the class, or exclusion from the course, or, in some cases, from the University. The *Course Book* affords the student an opportunity of preserving a record of his examinations.

### PAYMENTS TO THE UNIVERSITY.

The fee for tuition is \$25 a term, payable within ten days after registration.

Tuition is free to *State students*, to *resident graduates*, and to students pursuing the prescribed course in *Agriculture*, and *intending to complete* that course.

Every person taking laboratory work in chemistry, physics, zoölogy, or entomology, must deposit with the Treasurer security for the materials to be used in the laboratory. Students residing in the University buildings must pay their room-bills one term in advance. All the members of the University are held responsible for any injury done by them to its property.

### EXPENSES OF RESIDENCE.

The following is a fair estimate of the yearly expenses:

Tuition, \$25 a term,	-	-	-	-	-	\$ 75.00
Room, board, lights, fuel, and laundry, about	-	-				200.00
Text-books, etc., about	-	-	-	-	-	25.00
Total,						<hr/> \$300.00

The cost for board, rent of furnished room, fuel, and lights at the Sage College, which is exclusively for lady students, varies from \$5 to \$6.50 a week. A student occupying alone one of the best rooms pays \$6.50 a week. If two occupy such a room together, the price is \$5.75. Those occupying less desirable rooms, with two in a room, pay \$5 a week each. The entire building is warmed by steam, and, in most cases, the sleeping apartment is separate from the study.

The expense of living in Ithaca varies, for board, room, fuel, and lights, from \$4 to \$7 a week. By the formation of clubs, students may reduce their expenses to \$3.50 or \$2.50 a week for board.

## GRADUATION.

All the courses leading to a degree require four years for their completion.

Any student who has been admitted to an advanced standing provisionally on his admission to the University, must pass the examinations required for that standing at the first opportunity after his admission. Or, after having been in the University for a year or more, and having sustained a good character, maintained a high standing in his classes, and approved himself for scholarship, the student may, by a vote of the Faculty, be admitted to some definite standing, such as his scholarship will entitle him to—the Faculty by this act accepting his studies elsewhere as equivalent to what he would have done here, if he had entered the University at the beginning of his collegiate course.

## I. THE DEGREE OF BACHELOR.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are conferred after the satisfactory completion of the corresponding courses. The degree of Bachelor of Philosophy is also conferred after the satisfactory completion of the course in History and Political Science.

The degree of Bachelor of Science is conferred after the satisfactory completion of any one of the following courses: Science, Science and Letters, Chemistry and Physics, Analytical Chemistry, Electrical Engineering, Mathematics, and Natural History. The particular course is specified in the diploma.

The degree of Bachelor of Veterinary Science is conferred only after the completion of a full course of four years in that department.

No person may take more than one degree the same year.

## GRADUATION THESIS.

Each student, before taking a degree, must submit to the Faculty a satisfactory oration, poem, or essay on some subject in science, literature, or art, and deposit a copy in the Library. A successful thesis written for final honors may, at the student's option, be presented as his thesis for graduation.

A fee of \$5, to cover expenses of graduation, degrees, etc., is charged to each person taking the baccalaureate degree. This fee must be paid before the degree is conferred.

## CERTIFICATE OF LICENTIAE.

Licentiate certificates and certificates of proficiency are conferred upon students who have pursued a special branch of knowledge and made distinguished proficiency therein. They are given upon the recommendation of the respective Faculties.

## II. ADVANCED DEGREES.

Courses of study for graduates leading to advanced degrees are provided for in the following departments: Chemistry and Physics, Mathematics, Natural History; History and Political Science; Comparative Philology, Ancient Classical Languages and Literatures, Modern European Languages and Literatures, Oriental Languages and Literatures; Philosophy and Letters. Persons wishing to take an advanced degree in any of the above departments must apply to the Faculty to be admitted as candidates.

## 1. THE DEGREE OF MASTER.

The degree of Master of Arts or Master of Science is conferred on those who have taken the corresponding baccalaureate degree here, or wherever the requirements for that degree are equal to those of this University, on the following conditions:

1. The candidate must spend at least one year at the University in a course of study marked out for him by the Faculty, must present a satisfactory thesis, and pass an examination.

2. The same degrees are conferred without residence on graduates of this University only, on conditions the same as above, except that the degree is not given until three years after the baccalaureate degree has been conferred.

3. Graduates of this University may become candidates for either of the above second degrees by passing such additional examinations as are required for the corresponding first degree.

The degree of Master of Science is conferred on graduates in Philosophy on the same conditions as on graduates in Science.

## 2. THE DEGREE OF CIVIL ENGINEER.

The degree of Civil Engineer is conferred (1) on bachelors of Civil Engineering, after two years of study and practice, on passing the requisite examinations and presenting a satisfactory thesis; (2) on those who have completed the five-year course.

## 3. THE DEGREE OF DOCTOR.

The Degree of Doctor of Veterinary Medicine is conferred on



bachelors of Veterinary Science, after two years of additional study, on passing the requisite examination.

The degree of Doctor of Philosophy is conferred on graduates of this University, and of other universities and colleges whose requirements for the baccalaureate degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required for graduation in the course in Philosophy, a knowledge of Greek equal to that required for admission to the course in Arts.

2. The candidate must spend at least two years at the University pursuing a course of study marked out by the Faculty.

3. He must, at least six weeks before Commencement, present a meritorious thesis upon some subject included in the course, and pass the requisite examinations.

The degree of Doctor of Science is conferred on graduates of this University, and of other universities and colleges whose requirements for the baccalaureate degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have: a knowledge of Latin and Greek at least equal to that required for admission to the course in Natural History; a knowledge of French and German equal to that required for graduation in Science; a knowledge of mathematics, of science, of literature, and of philosophy equal to that required for graduation in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics, and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious thesis based on special investigations, or make some other contribution to science.

Candidates for the degree of Doctor must print their theses and deposit ten copies in the Library. Candidates for other advanced degrees must deposit one copy.

No student in a post-graduate course is allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or to be a candidate for more than one degree at the same time.



Candidates for a second degree must make application to the Registrar and present their theses at least twenty days before Commencement. The examinations for advanced degrees are held the second week before Commencement.

The fee charged for a second degree is \$10, and must in all cases be paid to the Treasurer before the degree is granted.

# COURSES OF STUDY.

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## GENERAL COURSES.

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### THE COURSE IN ARTS.

Leading to the Degree of Bachelor of Arts.

#### FRESHMAN YEAR.

FALL TERM.—Grecian history, 2; Greek, 3; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—Roman history, 2; Greek, 3; Latin, 4; rhetoric, 2; algebra, 5.

SPRING TERM.—Roman history, 2; Greek, 3; Latin, 4; rhetoric, 2; trigonometry, 5; military drill, 2.

#### SOPHOMORE YEAR.

FALL TERM.—Greek, 3; Latin, 4; physics, 3; essays and declamations, 1; military drill, 2; *optional*, 4.

WINTER TERM.—Greek, 3; Latin, 4; physics, 3; essays and declamations, 1; *optional*, 4.

SPRING TERM.—Greek, 3; Latin, 4; physics, 3; essays and declamations, 1; military drill, 2; *optional*, 4.

#### JUNIOR YEAR.

FALL TERM.—Essays, 1; psychology, 2; *optional*, 12.

WINTER TERM.—Essays and orations, 2; moral philosophy, 2; *optional*, 11.

SPRING TERM.—Essays and orations, 2; logic, 3; *optional*, 10.

#### SENIOR YEAR.

FALL TERM.—Literature and oratory, 3; history of philosophy, 3; *optional*, 9.

WINTER TERM.—Literature and oratory, 3; military science, 2; *optional*, 12.

SPRING TERM.—Literature and oratory, 1; *optional*, 11; thesis. Students electing *chemistry* must continue the study through the two terms.

## THE COURSE IN LITERATURE.

Leading to the Degree of Bachelor of Literature.

### FRESHMAN YEAR.

FALL TERM.—French *or* German, 3 (both languages are required in the course); Latin, 4; rhetoric, 2; geometry and conic sections, 5; Grecian history, 2; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 3; Latin, 4; rhetoric, 2; algebra, 5; Roman history, 2.

SPRING TERM.—French *or* German, 3; Latin, 4; rhetoric, 2; trigonometry, 5; Roman history, 2; military drill, 2.

### SOPHOMORE YEAR.

FALL TERM.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; physiology, 3; military drill, 2.

WINTER TERM.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; *optional*, 3.

SPRING TERM.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; botany, 3; military drill, 2.

### JUNIOR YEAR.

FALL TERM.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays, 1; psychology, 2; Latin, modern languages, *or* science, 4.

WINTER TERM.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays and orations, 2; moral philosophy, 2; Latin, modern languages, *or* science, 4.

SPRING TERM.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays and orations, 2; logic, 3; Latin, modern languages, *or* science, 4.

### SENIOR YEAR.

FALL TERM.—English literature, special course, 2; literature and oratory, 3; history of philosophy, 3; Latin, modern languages, *or* science, 7.

WINTER TERM.—English literature, special course 2; literature and oratory, 3; philosophy of history, 3; military science, 2; Latin, modern languages, *or* science, 7.

SPRING TERM.—English literature, special course, 2; literature and oratory, 1; American law, 5; Latin, modern languages, *or* science, 4; preparation of thesis.

## THE COURSE IN PHILOSOPHY.

Leading to the Degree of Bachelor of Philosophy.

### FRESHMAN YEAR.

FALL TERM.—French *or* German, 5 (both languages are required in the course); Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; algebra, 5.

SPRING TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; trigonometry, 5; military drill, 2.

### SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (invertebrate), 3; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (vertebrates), 3; Latin, modern languages, mathematics, *or* science, 3.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; botany, 3; military drill, 2; Latin, modern languages, mathematics, *or* science, 3.

### JUNIOR YEAR.

FALL TERM.—English literature, 3; essays, 1; physics *or* chemistry, laboratory work, 3; geology, 3; psychology, 2; languages, mathematics, *or* science, 4.

WINTER TERM.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; general palæontology, 2; physics *or* chemistry, laboratory work, 4; moral philosophy, 2.

SPRING TERM.—English literature, 3; essays and orations, 2; physical astronomy, 3; physics *or* chemistry, laboratory work, 3; logic, 3; languages, mathematics, *or* science, 2.



## SENIOR YEAR.

FALL TERM.—Literature and oratory, 3; history of philosophy, 3; *optional*, 9.

WINTER TERM.—Literature and oratory, 3; philosophy of history, 3; military science, 2; *optional*, 9.

SPRING TERM.—Literature and oratory, 1; American law, 5; *optional*, 6; preparation of thesis.

Students in Philosophy may take the Grecian and Roman history of the first year as an extra study and receive credit therefor towards graduation.

## THE COURSE IN SCIENCE.

Leading to the Degree of Bachelor of Science.

## FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5; linear drawing, 2.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; trigonometry, 5; descriptive geometry, text and drawing, 4; military drill, 2.

## SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (invertebrates), 3; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (vertebrates), 3; chemistry *or* zoölogy (vertebrates), laboratory work, 3.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; blow-pipe analysis, 1; botany, 3; military drill, 2.

## JUNIOR YEAR.

FALL TERM.—English literature, 3; essays, 1; physics, laboratory work, 3; organic chemistry, 2; geology, 3; *optional* five

hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry* (including *mineralogy*), *zoölogy*.

WINTER TERM.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; physics, laboratory work, 3; general palæontology, 2; *optional*, three hours, which must be given to one of the following sciences: *botany*, *chemistry*, *zoölogy*.

SPRING TERM.—English literature, 3; essays and orations, 2; physical astronomy, 3; physics, laboratory work, 3; *optional*, five hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry*, *geology*, *zoölogy*.

#### SENIOR YEAR.

FALL TERM.—*Optional*, fifteen hours, of which at least eight must be given to two of the following sciences (three or five hours to each): *botany*, *chemistry*, *geology*, *zoölogy*.

WINTER TERM.—Political economy, 2; military science, 2; advanced palæontology, 3; *optional*, ten hours, subject to the same conditions as in the fall term.

SPRING TERM.—Constitution of the United States, twelve lectures; *optional*, eleven hours, subject to the same conditions as in the fall term; preparation of thesis.

The optional hours not required for science in the junior and senior years may be devoted to either scientific, literary, historical, or philosophical subjects. In electing their studies in science for the junior and senior years, students must take at least the minimum given throughout the year of each science chosen.

Students taking the physics of the senior year must have had the calculus of the sophomore year; those taking the geology of the senior year must have had the blowpipe determination of minerals of the sophomore year.

### THE COURSE IN SCIENCE AND LETTERS.

Leading to the degree of Bachelor of Science.

#### FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; trigonometry, 5; military drill, 2.

#### SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; physiology, 3; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (invertebrates), 3; modern languages, mathematics, *or* science, 2; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (vertebrates), 3; modern languages, mathematics, *or* science, 2.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; botany, 3; modern languages, mathematics, *or* science, 2; military drill, 2.

#### JUNIOR YEAR.

FALL TERM.—English literature, 3; essays, 1; psychology, 2; geology, 3; *optional*, 7.

WINTER TERM.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; moral philosophy, 2; general palæontology, 2; *optional*, 4.

SPRING TERM.—English literature, 3; essays and orations, 2; physical astronomy, 3; logic, 3; *optional*, 5.

#### SENIOR YEAR.

FALL TERM.—Literature and oratory, 3; history of philosophy, 3; *optional*, 9.

WINTER TERM.—Literature and oratory, 3; philosophy of history, 3; military science, 2; *optional*, 9.

SPRING TERM.—Literature and oratory, 1; American law, 5; *optional*, 6; preparation of thesis.

## SPECIAL AND TECHNICAL COURSES.

### THE COURSE IN AGRICULTURE.

Leading to the Degree of Bachelor of Agriculture.

#### FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.



WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; agricultural chemistry, lectures and laboratory work, 3; military drill, 2.

## SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; experimental mechanics and heat, 3; agricultural chemistry, 5; chemistry, qualitative analysis, 3; anatomy, laboratory work, 2; military drill, 2.

WINTER TERM.—French *or* German, 3; electricity and magnetism, 3; agricultural chemistry, lectures, 4; chemistry, qualitative analysis, 2; zoölogy, lectures and laboratory work (vertebrates), 3; anatomy, laboratory work, 2.

SPRING TERM.—French *or* German, 3; acoustics and optics, 3; land surveying, 4; botany, lectures, 3; field-work, 2; blowpipe analysis and determinative mineralogy, 2; military drill, 2.

## JUNIOR YEAR.

FALL TERM.—Botany, compositæ and gramineæ, 3; arboriculture and landscape gardening, 2; geology, 3; veterinary anatomy and physiology, 5; botany *or* chemistry, laboratory work, 3.

WINTER TERM.—Chemistry, quantitative analysis, 6; vegetable physiology, 3; vegetable histology, 2; veterinary pathology, sanitary science and parasites, 5.

SPRING TERM.—Chemistry, quantitative analysis, 7; entomology, lectures, 2, laboratory work, 2; veterinary medicine and surgery, 5.

## SENIOR YEAR.

FALL TERM.—Agriculture, lectures, 5, field-work, 3; fungi and algæ, 4; principles of horticulture, 2; entomology, laboratory work, 3.

WINTER TERM.—Agriculture, lectures, 5, field-work, 2; systematic and applied botany, 3; botany *or* chemistry, laboratory work, 5; military science, 2.

SPRING TERM.—Agriculture, lectures, 3, field-work, 3; building materials and construction, 2; American law, 5.

## THE COURSE IN ARCHITECTURE.

Leading to the Degree of Bachelor of Architecture.

## FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; linear drawing, 1; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; projection and tinting, 1.

SPRING TERM.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; botany, 3; military drill, 2.

## SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; composition and elocution, 1; analytical geometry, 5; descriptive geometry, text and drawing, 6; experimental mechanics and heat, 3; military drill, 2.

WINTER TERM.—French *or* German, 3; composition and elocution, 1; calculus, 5; drawing, 3; electricity and magnetism, 3; chemistry, lectures, 3.

SPRING TERM.—French *or* German, 3; composition and elocution, 1; drawing, 1; acoustics and optics, 3; chemistry, lectures, 3; blowpipe analysis and determinative mineralogy, 2; building materials and construction, 3; military drill, 2.

## JUNIOR YEAR.

FALL TERM.—Mechanics, strength of materials, 3; shades, shadows, and perspective, 3; drawing, 3; Egyptian, Greek, and Roman architecture, 3; designing, 4.

WINTER TERM.—Mechanics, trusses, 3; Byzantine and Romanesque architecture, 5; designing, 3; construction, 2; economic geology, 3.

SPRING TERM.—Mechanics, arches, 3; freehand drawing, 3; Gothic architecture, 5; designing, 3; construction, 2.

## SENIOR YEAR.

FALL TERM.—Renaissance architecture, 3; decoration, 3; designing, 6; stereotomy, 3.

WINTER TERM.—Modern architecture, 3; designing, 7; stereotomy applied to stone-cutting, 5; military science, 2.

SPRING TERM.—Acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., 5; designing, 7.

## THE COURSE IN ANALYTICAL CHEMISTRY.

Leading to the Degree of Bachelor of Science.

## FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; chemistry, lectures, 3, laboratory work, 3.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; chemistry, lectures, 3, laboratory work, 3; military drill, 2.

## SOPHOMORE YEAR.

FALL TERM.—Analytical geometry, 5; experimental mechanics and heat, 3; organic chemistry, 2; chemistry, laboratory work, 8; military drill, 2.

WINTER TERM.—Electricity and magnetism, 3; chemistry, laboratory work, 15.

SPRING TERM.—Acoustics and optics, 3; physics, laboratory work, 3; chemistry, laboratory work, 9, blowpipe analysis, 3; military drill, 2.

## JUNIOR YEAR.

FALL TERM.—Chemical philosophy, 3; chemistry, laboratory work, 9; mineralogy, 3; geology, 3.

WINTER TERM.—Chemical philosophy, 3; chemistry, laboratory work, 9; assaying, 3; economic geology, 3.

SPRING TERM.—Chemical philosophy, 3; chemistry, laboratory work, 15.

## SENIOR YEAR.

FALL TERM.—Chemistry, laboratory work, 18.

WINTER TERM.—Chemistry, laboratory work, 18; military science, 2.

SPRING TERM.—Chemistry, laboratory work, 15; preparation of thesis.

## THE COURSE IN CHEMISTRY AND PHYSICS.

Leading to the Degree of Bachelor of Science.

## FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.



WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; trigonometry, 5; military drill, 2.

#### SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; chemistry, laboratory work, 3; military drill, 2.

WINTER TERM.—French *or* German, 3; electricity and magnetism, 3; chemistry, lectures, 3; laboratory work, 8.

SPRING TERM.—French *or* German, 3; acoustics and optics, 3; chemistry, lectures, 3, blowpipe analysis, 3; botany, 3; military drill, 2.

#### JUNIOR YEAR.

FALL TERM.—Organic chemistry, 2; mineralogy, 3; chemistry and physics, laboratory work, 8; *optional, science*, 3.

WINTER TERM.—Chemical philosophy, 3; metallurgy, 2; chemistry and physics, laboratory work, 9; *optional, science*, 3.

SPRING TERM.—Chemical philosophy, 3; chemistry and physics, laboratory work, 11; *optional, science*, 3.

#### SENIOR YEAR.

FALL TERM.—Chemical journals, 1; history of philosophy, 3; chemistry and physics, laboratory work, 10; *optional, science*, 3.

WINTER TERM.—Chemical journals, 1; metallurgy, 2; chemistry and physics, laboratory work, 9; military science, 2; *optional, science*, 3.

SPRING TERM.—Chemical journals, 1; chemistry and physics, laboratory work, 12; preparation of thesis.

Of the laboratory work of the junior and senior years not less than four hours must be given to chemistry each term, and not less than four hours to physics.

### THE COURSES IN CIVIL ENGINEERING.

#### I. A FOUR-YEAR COURSE.

Leading to the Degree of Bachelor of Civil Engineering.

#### FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; technical essays, 1; military drill, 2; hygiene, six lectures.

# The Preparatory Schools of Ithaca.

## THE CASCADILLA SCHOOL,

Established in 1876, a school of special instruction for University students and for those preparing for college.

*Classes*, reciting two and three times a week, are formed during the fall, winter, and spring terms, for University students studying for honors, or needing special help in the regular Greek, Latin, and mathematics, and in the French and German of the freshman year. These classes will recite either late in the afternoon or in the evening.

University students who may wish to change their course to one requiring additional preparation, and those who may fail to pass their examinations, receive such instruction as they severally need.

Special attention is given to preparing pupils for admission to any department or course in Cornell University. Pupils are also fitted for other colleges and scientific schools.

Attention is called to the *Summer Term* and to the September, December and March *Reviews*, of two weeks each, particularly designed for those who wish to review rapidly subjects for the September and January entrance examinations.

### CALENDAR FOR 1884-85.

SEPTEMBER REVIEW—Begins Saturday, Aug. 30; ends Friday, September 12.

FALL TERM—Begins Saturday, September 20; ends Friday, December 12.

DECEMBER REVIEW—Begins Saturday, December 20; ends Friday, January 2.

WINTER TERM—Begins Saturday, January 10; ends Friday, March 20.

MARCH REVIEW—Begins Saturday, March 28; ends Wednesday, April 8.

SPRING TERM—Begins Saturday, April 4; ends Friday, June 5.

SUMMER TERM—Begins Monday, June 29; ends Friday, August 21.

SEPTEMBER REVIEW—Begins Saturday, August 29; ends Friday, September 11.

FALL TERM—Begins Saturday, September 19; ends Friday, December 11.

Lessons will be assigned on the first day of each term or review, at 3 p. m., at the school rooms in Cascadilla Place.

For further information, address

SECRETARY OF CASCADILLA SCHOOL,


Lock Box 2152.

Ithaca, N. Y.

## MR. KINNE'S SCHOOL.

The business of this School is to fit its pupils for admission to any of our Colleges or Scientific Schools. Since its establishment in 1869, no scholar that has taken a full course has failed in his entrance examinations.

The accommodations are of a superior kind. Each Scholar has a room to himself. The number of Scholars is limited. They are under the immediate care and instruction of the Principal, and keep regular study hours in his presence, both in the day time and in the evening. Students in need of special instruction will find in this School the help they need.

 No member of the School uses tobacco. The presence of no Scholar of bad habits is tolerated.

For board and tuition \$400 is payable in advance,—\$156 at the beginning of the Fall term,—\$122 at the beginning of the Winter and Spring terms each. Board includes fuel, lights and washing—one dozen a week.

The School year is of about forty weeks, from the middle of September to the middle of the following June,—with a recess including Christmas and New Year's,—and another about the first of April.

Books can be obtained in Ithaca at reasonable rates.



## ITHACA HIGH SCHOOL.

At the opening of the fall term on the first Monday in September, 1885, this school will take possession of the elegant and commodious building now being erected, and will then possess ample accommodations for all who may desire to avail themselves of the opportunity here offered to prepare for Cornell University or for business.

Excellent facilities will be provided to fit students for any course in the University. Text books are furnished free. Tuition, \$7.50 per quarter of ten weeks.

For further particulars, address

L. C. FOSTER,

Supt. of Schools,

Ithaca, N. Y.



WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; linear drawing, 2; technical essays, 1.

SPRING TERM.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; botany, 3; technical essays, 1; military drill, 2.

#### SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; analytical geometry, 5; descriptive geometry, text and drawing, 6; experimental mechanics and heat, 3; technical essays, 1; military drill, 2.

WINTER TERM.—French *or* German, 3; calculus, 5; pen topography, 2; tinting and shading, 2; electricity and magnetism, 3; chemistry, lectures, 3; technical essays, 1.

SPRING TERM.—Calculus, 5; land surveying, 4; acoustics and optics, 3; chemistry, lectures, 3; blowpipe analysis, 1; technical essays, 1; military drill, 2.

#### JUNIOR YEAR.

FALL TERM.—Calculus, 5; mineralogy, 2; shades, shadows, and perspective, 3; topographical mapping and sketching, 2; lettering, 1; kinematics, *or* physics, laboratory work, 3; technical essays, 1.

WINTER TERM.—Mechanics of engineering, 5; detail drawing and graining, 2; physics, laboratory work, 3; metallurgy, 2; economic geology, 3; technical essays, 1.

SPRING TERM.—Mechanics of engineering, 4; railroad surveying, 4; colored topography, 3; lettering, 2; lake work, 3; technical essays, 1.

#### SENIOR YEAR.

FALL TERM.—Mechanics of engineering, 5; spherical astronomy, 5; practical astronomy, night observations, 2; Egyptian, Greek, and Roman architecture, *or* physics, laboratory work, 3; stereotomy and original problems, 3; civil engineering, 2; technical essays, 1.

WINTER TERM.—Hydraulics, 5; higher geodesy, 5; bridge stresses, 2; stone-cutting and original problems and practice, 5; technical essays, 1; military science, 2.

SPRING TERM.—Hydraulic motors, 2; civil engineering, 2; engineering economy, 2; bridge stresses, 4; hydrographic surveying, chart-making, and geodesy, field-work, 3; lake work, 3; technical essays, 1; preparation of thesis.

Students in the course in civil engineering are required to write essays upon professional subjects; and these essays are

read and discussed at the weekly meetings of the Civil Engineering Association.

## II. A FIVE-YEAR COURSE.

Leading to the Degree of Civil Engineer.

The first four years are the same as in the four-year course. The choice of *optionals* in the fifth year is subject to the approval of the head of the department.

Students in the fifth year pay no tuition fees and have all the privileges of resident graduates.

### FIFTH YEAR.

FALL TERM.—Riparian rights and law of contracts, 3; bridge construction and details, 3; projects, designs, and specifications, 3.

*Optional*, 9: Grecian history, 2; modern history, 3; psychology, 2; American history, 3; physiology and zoölogy, 6; languages, 2; technical reading, 2; renaissance architecture, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; rock drills and air compressors, 3; the steam-engine, 3; mining projects, 3; geology, 3; mineralogy, 3; mathematics, 3.

WINTER TERM.—River and harbor improvements, 3; advanced astronomy and geodesy, 3; technical reading, 2; projects, designs, and specifications, 2.

*Optional*, 8: Roman history, 2; American history, 3; political economy, 2; languages, 2; pure or applied mathematics, 5; zoölogy, 3; metallurgy, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; Romanesque architecture, 3; the steam-engine, 3; mining projects, 2; geology, 3.

SPRING TERM.—Sanitary engineering, 3; locomotive machines, etc., 3; projects, designs, and specifications, 2.

*Optional*, 6: Roman history, 2; modern history, 2; American history, 3; languages, 3; pure or applied mathematics, 4; historical or technical reading, 3; geology, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; Gothic architecture, 3; pumps and small machinery, 2; mining projects, 4; arch ribs, 3; geodesy, field-work.

## THE COURSE IN ELECTRICAL ENGINEERING.

Leading to the Degree of Bachelor of Science.

## FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; instrumental drawing, 2.

SPRING TERM.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; rhetoric, 2; military drill, 2.

## SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; analytical geometry, 5; experimental mechanics and heat, 3; descriptive geometry, text and drawing, 6; military drill, 2.

WINTER TERM.—French *or* German, 3; calculus, 5; electricity and magnetism, 3; chemistry, lectures, 3; shop-work, 3.

SPRING TERM.—Calculus, 5; acoustics and optics, 3; chemistry, lectures, 3; mechanism drawing, 3; shop-work, 3; military drill, 2.

## JUNIOR YEAR.

FALL TERM.—Calculus, 5; physics, laboratory work (mechanics, measurements), 3; chemistry, laboratory work, 3; mechanism, 3; shop-work, 3.

WINTER TERM.—Mechanics of engineering, 5; physics, laboratory work (electricity, general experiments), 3; chemistry, laboratory work, 3; mechanism, 3; shop-work, 3.

SPRING TERM.—Mechanics of engineering, 5; physics, laboratory work (acoustics and optics), 5; chemistry, laboratory work, 4; mechanical drawing, 3.

## SENIOR YEAR.

FALL TERM.—Mechanics of engineering, 5; physics, lectures and laboratory work (testing of instruments and determinations of constants), 6; steam-engine, 3; mechanical drawing, 3.

WINTER TERM.—Physics, lectures and laboratory work (dynamo machines and electrical motors, tests of efficiency), 5; steam-engine, 3; hydraulics, 5; mechanical drawing, 4; military science, 2.



**SPRING TERM.**—Physics, lectures and laboratory work (photometry, tests of electric lamps, telegraph instruments, telegraph lines, and cables), 9; mechanical drawing, 3; preparation of thesis.

### THE COURSE IN MECHANIC ARTS.

Leading to the Degree of Bachelor of Mechanical Engineering.

#### FRESHMAN YEAR.

**FALL TERM.**—German, 5; geometry and conic sections, 5; free-hand drawing, 3; shop-work, 3; military drill, 2.

**WINTER TERM.**—German, 5; algebra, 5; freehand drawing, 3, instrumental drawing, 2; shop-work, 3.

**SPRING TERM.**—German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; shop-work, 3; military drill, 2.

#### SOPHOMORE YEAR.

**FALL TERM.**—German, 3; rhetoric, 2; analytical geometry, 5; experimental mechanics and heat, 3; shop-work, 3; military drill, 2.

**WINTER TERM.**—German, 3; rhetoric, 2; calculus, 5; electricity and magnetism, 3; mechanism drawing, 2; shop-work, 3.

**SPRING TERM.**—Calculus, 5; mechanism drawing, 4; mechanical drawing, 3; shop-work, 3; military drill, 2.

#### JUNIOR YEAR.

**FALL TERM.**—Calculus and analytical geometry, 5; descriptive geometry, text and drawing, 6; mechanism, 3; shop-work, 3.

**WINTER TERM.**—Mechanics of engineering, 5; mechanism, 3; physics, laboratory work, 3; chemistry, lectures, 3; shop-work, 3.

**SPRING TERM.**—Mechanics of engineering, 5; mechanical drawing, with shades, tinting, and perspective, 3; physics, laboratory work, 3; chemistry, lectures, 3; shop-work, 3.

#### SENIOR YEAR.

**FALL TERM.**—Mechanics of engineering, 5; mechanical and working drawings, 3; physics, laboratory work, 3; steam-engine, 3; shop-work, 3.

**WINTER TERM.**—Mechanical drawing, 4; steam-engine, 3; metallurgy, 2; experimental work with indicators, governors, pumps and injectors, 3; shop-work, 3; military science, 2.

**SPRING TERM.**—Graphical statics, 3; the use of instruments and field-work, 3; building materials, 3; mechanical drawing and preparation of thesis, 3; shop-work, 3.

## GRADUATE COURSE.

FALL TERM.—Machines for regulating, counting, etc., 3; mechanical *or* physical experiments, *or* chemistry, 3; riparian laws, contracts, patent-office laws, etc., 2. *Optional*, 7.

WINTER TERM.—Machine for change of form, 3; mechanical *or* physical experiments, *or* chemistry, 3; technical reading, 2. *Optional*, 7.

SPRING TERM.—Locomotive machines, hoists, cranes, etc., 3; mechanical *or* physical experiments, *or* chemistry, 3; shop systems and accounts, 2. *Optional*, 7.

The optional studies are hydraulics, assaying, blowpipe analysis and mineralogy, chemistry (laboratory work), physics, (acoustics and optics), motors other than steam, architecture, civil engineering, shop-work, mathematics, botany, French, rhetoric, history, literature.

## THE COURSE IN MATHEMATICS.

Leading to the Degree of Bachelor of Science.

## FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; linear drawing, 2.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; descriptive geometry, text and drawing, 4; military drill, 2.

## SOPHOMORE YEAR.

FALL TERM.—Analytical geometry, 5; mathematical essays, 1; experimental mechanics and heat, 3; descriptive geometry, text and drawing, 6; essays and declamations, 1; military drill, 2.

WINTER TERM.—Calculus, 5; projective geometry, French textbook, 4; mathematical essays, 1; electricity and magnetism, 3; chemistry, 3; essays and declamations, 1.

SPRING TERM.—Calculus, 5; mathematical essays, 1; acoustics and optics, 3; chemistry, 3; botany, 3; essays and declamations, 1; military drill, 2.

## JUNIOR YEAR.

FALL TERM.—Calculus and analytical geometry, 5; mathematical essays, 1; physics, laboratory work, 3; shades, shadows, and perspective, 3; essays, 1; *optional, not mathematics*, 3.

WINTER TERM.—Differential equations, 5; descriptive astronomy, 3; mathematical essays, 1; physics, laboratory work, 3; essays and orations, 2; *optional, not mathematics*, 3.

SPRING TERM.—Differential equations and finite differences, 5; physical astronomy, 3; mathematical essays, 1; physics, laboratory work, 3; essays and orations, 2; *optional, not mathematics*, 3.

#### SENIOR YEAR.

FALL TERM.—Imaginaries and elliptic functions, 3; *mécanique analytique*, 2; quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 4; mathematical essays, 1; English literature, 3; *optional, not mathematics*, 3.

WINTER TERM.—Imaginaries and elliptic functions, 3; *mécanique analytique*, 2; quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 4; mathematical essays, 1; English literature, 3; military science, 2; *optional, not mathematics*, 3.

SPRING TERM.—Imaginaries and elliptic functions, 3; *mécanique analytique*, 2; mathematical essays, 1; English literature, 3; Constitution of the United States, twelve lectures; *optional, not mathematics*, 3; preparation of thesis.

### THE COURSE IN NATURAL HISTORY.

Leading to the Degree of Bachelor of Science.

#### FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemistry, laboratory work, 3; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemistry, lectures, 3; freehand drawing, 3.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; chemistry, lectures, 3, laboratory work, 3; freehand drawing, 2; military drill, 2.

#### SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; experimental mechanics and heat, 3; physiology, 3; zoölogy, lectures and laboratory work (invertebrates), 3; anatomy, laboratory work, 2; anatomical technology, 1; military drill, 2.



WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; zoölogy, lectures and laboratory work (vertebrates), 3; laboratory work in physiological anatomy and histology, 5; microscopical technology, 1.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; blowpipe analysis, 1; botany, lectures, 3, field work, 2; anatomy; laboratory work, 2; museum methods and experimental technology, 1; military drill, 2.

#### JUNIOR YEAR.

FALL TERM.—Essays, 1; psychology, 2; physics, laboratory work, 2; chemistry, organic, *or* laboratory work, 2; mineralogy, 2; botany, compositæ and gramineæ, lectures and laboratory work, 3; geology, 3.

WINTER TERM.—Essays and orations, 1; descriptive astronomy, 3; physics, laboratory work, 2; systematic and applied botany, *or* vegetable physiology, 3; vegetable histology, 2; general palæontology, 2; laboratory work, 2.

SPRING TERM.—Essays and orations, 1; logic, 3; physical astronomy, 3; entomology, lectures, 2; geology, laboratory or field work, 3; *optional*, 4, in any two of the following subjects: physics, laboratory work, 2; botany, higher cryptogams, 2; comparative anatomy of the brain, 2; entomology, laboratory or field work, 2.

#### SENIOR YEAR.

FALL TERM.—History of philosophy *or* modern history, 3; botany, lower cryptogams, lectures and laboratory work, 4; palæontology *or* geology, laboratory and field work, 3; *optional*, 6, which may be devoted to any branch of natural history, including veterinary science.

WINTER TERM.—Modern history, 3; systematic and applied botany *or* vegetable physiology, 3; advanced palæontology, 3; military science, 2; *optional*, 5, which may be devoted to any branch of natural history, including veterinary science.

SPRING TERM.—Modern history, 2; palæontology, laboratory work, 3; *optional*, 9, which may be devoted to the preparation of a thesis, or to any branch of natural history, including veterinary science.

A TWO-YEAR COURSE PREPARATORY TO THE  
STUDY OF MEDICINE.

Not Leading to a Degree.

## FRESHMAN YEAR.

FALL TERM.—French, 5; freehand drawing, 3; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (invertebrates), 3; physiology, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5; electricity and magnetism, 3; chemistry, lectures, 3, laboratory work, 3; zoölogy, lectures and laboratory work (vertebrates), 3.

SPRING TERM.—French, 5; acoustics and optics, 3; chemistry, lectures, 3; botany, lectures, 3, laboratory work, 2; military drill, 2.

## SOPHOMORE YEAR.

FALL TERM.—German, 5; psychology, 2; organic chemistry, 2; anatomy, physiology, and hygiene of domestic animals, 5; anatomical technology, 1; anatomy, laboratory work, 2; military drill, 2.

WINTER TERM.—German, 5; vegetable physiology, 3; veterinary pathology, parasites, and sanitary science, 5; microscopical technology, 1; histology, laboratory work, 2; vegetable physiology, laboratory work, 2.

SPRING TERM.—German, 5; medical chemistry, 3; comparative anatomy of the brain, 2; anatomy, laboratory work, 2; museum methods and experimental technology, 1; veterinary medicine and surgery, 5; military drill, 2.

Upon the completion of this course, or its equivalent, the student is entitled to a certificate countersigned by the professor of physiology. These certificates usually exempt the holders from one of the three years study under the direction of a physician, commonly required for graduation in medicine.

## THE COURSE IN HISTORY AND POLITICAL SCIENCE.

Leading to the Degree of Bachelor of Philosophy.

The first two years of this course are regarded as mainly introductory to the studies which peculiarly belong to the general

subjects of the course. Students who have completed the first two years in either of the courses in Arts, Literature, or Philosophy, may be admitted to full standing as juniors in the course in History and Political Science on passing a satisfactory examination in the History required in the first two years in this course.

Besides the prescribed work, lectures are given on important topics connected with the general subjects of the course by non-resident professors and lecturers; and these lectures, whenever given, must be attended by all the students in the course.

#### FRESHMAN YEAR.

FALL TERM.—French *or* German, 5 (both languages are required in the course); Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2.

WINTER TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; algebra, 5.

SPRING TERM.—General European history, 2; French *or* German, 5; Latin, 4; rhetoric, 2; plane trigonometry, 3; military drill, 2.

#### SOPHOMORE YEAR.

FALL TERM.—Grecian history, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; Greek, Latin, modern languages, mathematics, *or* natural sciences, 3.

WINTER TERM.—Roman History, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; Greek, Latin, modern languages, mathematics, *or* natural sciences, 3.

SPRING TERM.—Roman history, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; theory of probabilities and statistics, 3; military drill, 2.

#### JUNIOR YEAR.

FALL TERM.—American history, 3; English constitutional history, *or* systematic politics, 5; mediæval and modern history, 3; psychology, 2; sanitary science, labor laws, and penal discipline, *or optional*, 2.

WINTER TERM.—American history, 3; modern history, 3; political economy, 2; moral philosophy and political ethics, 2; essays and orations, 2; *optional*, 3.

SPRING TERM.—American history, 3; modern history, 2; political economy, 2; logic, 3; essays and orations, 2; *optional*, 3.



## SENIOR YEAR.

FALL TERM.—American history, 3; modern history, 3; English constitutional history, or systematic politics, 5; history of philosophy and the natural sciences, 3.

WINTER TERM.—American history, 3; modern history, 3; philosophy of history, 3; international law, 5; military science, 2.

SPRING TERM.—American history, 3; modern history, 2; American law and jurisprudence, 5; finance and political economy, 5; preparation of thesis.

## GENERAL DEPARTMENTS OF INSTRUCTION.

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Any person wishing more detailed information than is given in the Register as to courses of study, methods of instruction, etc., may address the professor in charge of the department to which his inquiries relate.

### AGRICULTURE.

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#### I. APPLIED AGRICULTURE.

The requirements for admission to the course in Agriculture are such as to put the advantages which it offers within the reach of every young man who has made good use of the instruction afforded in the public schools. The instruction is given by lectures and recitations, illustrated with the aid of the Auzoux models and various other collections belonging to the University. Besides the class-room exercises, the student devotes as much time as can be spared to practice in the botanical, chemical, and veterinary laboratories, as well as in the fields and barns.

In Applied Agriculture, five hours a week, during the senior year, are devoted to technical instruction in all its leading, and most of its minor, branches. The student is also required to spend three hours a day, two days in each week, in field work, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make him familiar with the various operations of the farm, additional time is required during the summer vacation.

The instruction by lectures begins with the senior year, and continues through the three terms of that year.

Fall Term: Wheat—culture, varieties, preparation of the soil, seeding, injurious insects, harvesting, threshing, marketing;

Swine—the history of breeds, feeding, general management, piggeries; Farm Buildings—location, plans, material, construction, repairs and preservation, contracts, liabilities of contractors; Fields—shape and size; Fences and Gates—construction, number, kind, repairs, durability of wood used; Farm and public roads, bridges and culverts—location, construction, repairs; Farms—selection and purchase with regard to remoteness or nearness to markets, agricultural capabilities, roads, improvements, schools, and society; Titles, deeds, judgments, and mortgages; Farm-Yard Manures—composition, manufacture, preservation, application; Commercial Fertilizers—composition, application, utility.

Winter Term: Farm Accounts; Principles of Stock-breeding—law of similarity, of variation as caused by food, habit and climate, atavism, relative influence of male and female, prepotency, sex, in-and-in breeding, crossing and out-crossing, grading up or breeding in line; Races and Breeds—pedigrees, leading breeds of neat animals treated as to history, markings, characteristics, and adaptation to uses, soil, climate, and locality; Breeding, feeding, and management of cattle; Butter, cheese, and milk dairies, and beef production; Sheep Husbandry treated in detail same as cattle.

Spring Term: The Horse—breeds and breeding, education, care, driving, stables; Farm Drainage—mapping of drains, material, construction, utility; Plows and plowing; Farm Implements and Machinery—use, care, and repairs; Corn, oat, barley, and flax culture; Grasses and forage plants; Weeds and their eradication; Business customs, rights and privileges; Notes, contracts, and obligations; Employment and direction of laborers.

#### UNIVERSITY FARM.

The Farm consists of 120 acres of arable land, the larger part of which is used for experimental purposes and the illustration of the principles of agriculture. Nearly all the domestic animals are kept to serve the same ends. Those portions of farm and stock not used for experiments are managed with a view to their greatest productiveness. Statistics of both experiments and management are kept on such a system as to show at the close of each year the profit or loss not only of the whole farm but of each crop and group of animals. Of the two barns with which the farm is equipped, one is largely devoted to the needs of the



Horticultural Department; the other, containing steam-engine, feed-cutter, stationary thresher, and other necessary appliances, furnishes accommodation for the general crops and stock, and for experimental work.

*Instructor* : Professor Roberts.

## II. AGRICULTURAL CHEMISTRY.

The study of Agricultural Chemistry comprises lectures and analytical practice in the laboratory. The lectures, seventy-five in number, embrace the following general subjects:

The general principles of chemical science, accompanied by introductory laboratory work; the chemistry of the elements and their compounds that constitute soils, plants, and animals; investigators in agricultural chemistry, their methods and means of working, and the literature of agricultural chemistry; the chemistry of vegetable life, and the production of vegetable substance in general; the physical and chemical properties and agricultural resources of the soil; tillage, drainage, etc., and amendments and manures; the composition of crops and other materials used for fodder; animal chemistry and nutrition; fermentation and putrefaction; milk and its manufactured products and residues; food, water, and air in their relations to human and animal life; the chemical analysis of fodder and food; farm crops and their manufactured products and residues.

The analysis of agricultural materials and products is treated in a course of chemical practice, as described under the head of Analytical Chemistry.

*Instructor* : Professor Caldwell.

## III. ECONOMIC ENTOMOLOGY.

The course comprises lectures, laboratory work, and field practice. There are two lectures per week during the spring term. In these lectures the characters of the orders, sub-orders, and the more important families are discussed; and especial attention is given to the study of the species which are of economic importance.

The laboratory and field work extends through two terms. In this part of the course the student is taught to determine species; and to make and prepare for publication original observations on the habits and structure of insects. For further details regarding the instruction in Entomology see this subject under the general head of Natural History.

## ENTOMOLOGICAL CABINET AND LABORATORY.

The entomological cabinet contains, in addition to many exotic insects, specimens of a large proportion of the more common species of the north-eastern United States. These specimens are arranged in two collections: one biological, containing specimens illustrative of the metamorphoses and habits of insects; the other systematic, in which the species are arranged so as to show their zoölogical affinities.

The Laboratory is equipped with a set of Auzoux models, microscopes, breeding cages, and other apparatus necessary for practical work in entomology.

*Instructor:* Professor Comstock.

## IV. HORTICULTURE.

The instruction comprises two courses of lectures during the fall term, supplemented by experimental or practical work.

Junior Year: A course of lectures upon arboriculture and landscape gardening.

Senior Year: A course of lectures upon the principles of horticulture.

Additional time is given to experimental work in the garden or conservatories. The instruction in botany, both in the laboratory and in the several courses of lectures, is intended to afford a scientific basis for the special instruction given in horticulture.

*Instructors:* Professor Prentiss and Assistant Professor Dudley.

## V. VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces: five lectures a week during an entire academic year; laboratory work on the bones, elastic models, pathological preparations, and parasites of domestic animals; clinical instruction on cases occurring in practice.

Fall Term: Lectures on the anatomy and physiology of the animals of the farm. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food, and water; to the varying anatomical peculiarities which imply special aptitude for particular uses; to the data for determining age; to the principles of breeding, of shoeing, etc.

Winter Term: Lectures on general comparative pathology; on



specific fevers and other contagious diseases; on the parasites and parasitic diseases of domestic animals; and on constitutional diseases. An important feature in this course is the subject of veterinary sanitary science and police, embracing, as it does, the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

Spring Term: Lectures on the local diseases of the various systems of organs in the different animals, and on veterinary surgery.

Opportunities are afforded to students who desire it to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study.

#### VETERINARY MUSEUM.

The Museum embraces the following collections:

1. The Auzoux veterinary models, comprising elastic models of the horse, showing the relative position of over three thousand anatomical parts; models and limbs, sound and with detachable pieces and their morbid counterparts, illustrating changes in diseases of the bones, joints, muscles, etc.; a set of obstetrical models, showing the virgin and gravid uterus in different animals, and the peculiarities of the female pelvis and its joints; models of the gastric cavities of domestic animals; an extensive set of models of jaws, showing the indications of age as well as of vicious habits and diseases; models and equine teeth in sections, showing structure and the changes effected by wear.

2. Skeletons of the domestic animals, articulated and unarticulated.

3. A collection of diseased bones, illustrating the various constitutional diseases which impair the nutrition of these structures, together with the changes caused by accidental injuries and purely local disease.

4. Skulls of domestic animals, prepared to illustrate the surgical operations demanded in the different genera.

5. Jaws of farm animals, illustrating the growth and wear of the teeth, age, dentinal tumors, caries, etc.

6. A collection of specimens of teratology, consisting of monstrous foals, calves, and pigs.

7. A collection of tumors and morbid growths removed from the different domestic animals.



8. Some hundreds of specimens of parasites from domestic animals.

9. A collection of calculi from the digestive and urinary organs, etc., of farm animals.

10. Foreign bodies taken from various parts of the animal economy.

11. A collection of surgical instruments used in veterinary practice.

12. A collection of medicinal agents.

13. In addition, a large number of diagrams, the property of Professor Law, available in illustration of different points in anatomy, physiology, and pathology.

For the Course in Agriculture, see page 58.

*Instructor:* Professor Law.

## ARCHITECTURE.

The Course in Architecture is so arranged as to give the student instruction in all subjects which he should understand in order to enter upon the practice of the art.

The instruction is given by means of lectures and practical exercises. Its object is not merely to develop the artistic powers of the student, but to lay that foundation of knowledge without which there can be no true art. Drawing is taught during the first two years, and afterward thoroughly used and applied in mechanics, stereotomy, and designing.

Architectural mechanics occupies a part of each term for one year. The lectures are each supplemented by at least two hours of work on problems. In developing the subjects and in solving problems, analytical methods are used, but for practical use special attention is paid to the application of graphical statics.

The study of the history of architecture and the development of the various styles runs through five terms. The lectures are illustrated by photographs, engravings, drawings, casts, and models.

Proper attention is paid to acoustics, ventilation, heating, decoration, contracts, and specifications. The whole ground of education in architecture, practical, scientific, historical, and æsthetic, is covered as completely as is practicable in a four-year course.

"Satisfactory attainments" for "special students" in Architecture will be as follows: Proficiency in all the branches of a good common-school education, in algebra and geometry, and in in-

strumental drawing. They must present themselves promptly at the beginning of the fall term of each year, and will not be admitted at any other time.

#### EQUIPMENT.

The White Architectural Library contains over one thousand volumes, and the photographic gallery nearly two thousand prints, all accessible to the student. Several hundred drawings, and about two hundred models in wood and stone have been prepared to illustrate the constructive forms and peculiarities of the different styles.

For the Course in Architecture see page 60.

*Instructors:* Professor Babcock and Assistant Professor Osborne.

#### FREEHAND DRAWING.

Instruction in Freehand Drawing is given by means of lectures and general exercises from the blackboard, from flat copies, and from models. The work embraces a thorough training of the hand and eye in outline drawing, elementary perspective, model and object drawing, drawing from casts, and sketching from nature.

The effort is not to make mere copyists, but to render the student familiar with the fundamental principles underlying this art, and to enable him to represent any object correctly and rapidly. The course is largely industrial, and the exercises are arranged, as far as possible, with special reference to the drawing required in the work of the different departments.

All students in the departments of Agriculture, Architecture, Civil Engineering, Electrical Engineering, Mechanic Arts, Mathematics, and Natural History devote two hours a day to freehand drawing during the first two terms of the freshman year; and students in Architecture, in addition, two hours a day during one term of the junior year. Students in the other courses may take drawing as an optional study.

#### EQUIPMENT.

The department has a large collection of studies of natural and conventional forms, both shaded and in outline; of geometrical models, and of papier-mâché and plaster casts, including a number of antique busts, casts of parts of the human figure, studies from nature, and examples of historical ornament.

*Instructors:* Professor Cleaves and Mr. C. D. White.

## CHEMISTRY AND PHYSICS.

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### I. PHYSICS.

The instruction comprises a general course of lectures designed as an introduction to the study of the subject, an elementary laboratory course designed to give a general knowledge of the science, and an advanced laboratory course.

The general course occupies one year, the exercises consisting of two experimental lectures and one recitation weekly. The subjects are pursued as follows: fall term, experimental mechanics and heat; winter term, electricity and magnetism; spring term, acoustics and optics. A knowledge of mathematics through plane trigonometry is required for registration in either of the subjects; and for registration in electricity and magnetism or in acoustics and optics, a knowledge of experimental mechanics and heat is also required.

The general course is required of all students except those in History and Political Science, and Literature; but those in Mechanic Arts do not take acoustics and optics.

The elementary laboratory course consists of a series of simple experiments arranged to perfect and fix the student's knowledge of physical facts and laws, and at the same time give him some experience in physical manipulation. The course occupies seven and a half hours a week (equivalent to three hours of lectures) for one year. Considering the very elementary character of the general course, this is the minimum time that can be devoted to the work with profit to the student. The elementary laboratory course is required of all students in Mechanic Arts, Chemistry and Physics, Science, and Mathematics, and parts of it are required of those in Civil Engineering and Natural History.

Students are admitted to the laboratory to pursue only such subjects as they have completed in the general course of lectures.

The advanced laboratory course consists of a series of experiments for the establishment of physical laws and the determination of constants. Many of these experiments involve the most refined methods of measurement. Students entering this course are expected to devote to it at least seven and a half hours a week. They may enter for one or more terms at their option, and may, within certain limits, elect the line of work they wish to pursue. Special students will devote a part of their time to an original investigation.



The elementary laboratory course described above is required for admission in the advanced course. A knowledge of analytical geometry and calculus will also be found very useful.

#### APPARATUS.

Ample rooms expressly designed for laboratory work are available. The collection includes a fine gravity escapement clock, a chronograph for measuring tenths of seconds, and another for measuring short intervals of time to the ten-thousandth of a second, two cathetometers, a dividing engine, a large spectrometer reading to seconds, a set of apparatus for electrical measurements, a set of apparatus for heat measurements, Bjerkness' apparatus to show the analogy between magnetic phenomena and the phenomena of bodies vibrating in a fluid, besides a large collection of illustrative apparatus.

*Instructors:* Professor Anthony and Assistant Professor Moler.

## II. DESCRIPTIVE AND THEORETICAL CHEMISTRY.

The instruction begins with lectures on inorganic chemistry in the winter term of the sophomore year, and continues through two terms. Three lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. During the fall term of the junior year, a course of lectures is given on the chemistry of organic bodies. In addition to the final examination at the end of the term, occasional examinations are held during the term, of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times.

For laboratory instruction in this branch of the subject a course of introductory practice is given in the spring term of the sophomore year. This course is required of students in Science, and of those in Chemistry and Physics, in Analytical Chemistry, and in Agriculture; it is required, further, of all students who take chemical practice as an optional study, in the beginning of their practice, except those who can give only the minimum time (seven and a half hours a week) for two or three terms, and who for sufficient reasons desire to devote all that time to chemical analysis. This introductory practice consists in the performance by the student of a series of experiments illustrating the more important general principles of the science. The details of the

manipulation of each experiment are carefully described, but the results to be obtained are not given. For the better cultivation of the student's powers of observation he is required to observe and describe these results for himself, and trace their connection with the principles which they are intended to illustrate.

The instruction in theoretical chemistry is continued in the courses of Chemistry and Physics, and in Analytical Chemistry by recitations in chemical philosophy, and by lectures on organic chemistry.

For the Courses in Analytical Chemistry, and Chemistry and Physics see page 61.

*Instructor* : Professor Schaeffer.

### III. MINERALOGY AND METALLURGY.

*Blowpipe Analysis.*—During the spring term of the sophomore year, instruction is given in qualitative blowpipe analysis, and in determinative mineralogy. The course is designed to enable the student to avail himself of the simple and effective means which the blowpipe affords in determining the nature of unknown substances. The work in determinative mineralogy comprises the identification of minerals by observation of their hardness, fusibility, blowpipe reactions, etc., and constitutes a necessary preparation for the study of systematic mineralogy and lithology. The laboratory of blowpipe analysis and mineralogy in the new chemical and physical building is supplied with all necessary conveniences for the aid of students in this department.

*Mineralogy.*—The study of systematic mineralogy is pursued during the fall term of the junior year, and comprises lectures, conferences, and the study of specimens. The study of crystallography forms an important part of the course of mineralogy, and includes lectures illustrated by a complete set of glass models, as well as laboratory practice in the identification of crystalline forms from blocks and actual specimens. Exceptional advantages for the study of mineralogy are offered by the large and well-arranged Silliman collection of minerals, which is accessible to students at all times. A complete and carefully selected students' collection affords abundant material for work in determinative mineralogy. Special attention is given to the more important metallic ores, as a preparation for the studies of economic geology and metallurgy.

*Assaying.*—A thorough course of practice in assaying is given

during the winter term of the junior year. Students are required to determine the value of gold, silver, and other metals contained in ores sufficient in number to make them familiar with the most approved methods in use in the West and in European mining regions. The assay of gold and silver bullion, as practiced in the national mints, forms a part of the course. The assay laboratory in the new building is equipped with every requisite for work in this branch, such as furnaces, tools, balances, etc.

*Metallurgy.*—During the winter term of the junior year two lectures a week are devoted to metallurgy. These lectures are intended to give the students in the technical courses a general idea of fuels, ores, and the most important methods of extracting the metals which are especially used in construction, the metallurgy of iron naturally claiming the most attention.

*Optional Work.*—Students pursuing courses in which blowpipe analysis, mineralogy, and assaying are not required, and who desire to pursue these studies as optional work, can take them only during the terms to which they are assigned in the schedule of the technical courses, and in the order indicated above. Thus, no one is admitted to work in blowpipe analysis who has not attended the lectures on inorganic chemistry; further, no one is admitted to the advanced class in mineralogy or assaying, or to the class in lithological laboratory work in the geological department, who has not completed one term's work in blowpipe analysis.

*Instructors:* Professor Schaeffer and Assistant Professor Newbury.

#### IV. AGRICULTURAL AND ANALYTICAL CHEMISTRY.

The general subject of Agricultural Chemistry is treated in a series of about seventy-five lectures, for an account of which see page 75.

The laboratory work in Analytical Chemistry, beginning in the sophomore year, comprises qualitative and quantitative analysis both in the wet way and in the dry way (blowpipe analysis and assaying), and is adapted in respect to length and completeness to the course of study the student is pursuing.

In Chemistry and Physics the qualitative analysis in the wet way and the blowpipe analysis are taken in the first two terms, beginning with the winter term of the sophomore year; this work may or may not, according to the proficiency attained in



these two terms, extend into the following term. In connection with the quantitative analysis, which occupies at least a large part of the time devoted to laboratory work in the junior and senior years of this course, some practice in qualitative analysis is continued.

The quantitative work begins with general practice in the determination of bases and acids by gravimetric and volumetric methods, after which follow the analysis of minerals, ores and technical products in the wet way, and dry assaying, ultimate, and proximate organic analysis, the analysis of gaseous mixtures, the sanitary examination of water, the technical examination of foods, beverages, and other articles of common use, spectroscopic analysis, the determination of vapor densities, the preparation of substances, and, finally, the thesis for graduation (provided that this be taken in Chemistry), to which most of the time of the last two terms of the course should be devoted.

In the course in Analytical Chemistry much the same order of chemical work is followed as in the course in Chemistry and Physics; but more time is given to its important subdivisions, affording to the student the opportunity of acquiring a more familiar knowledge of different methods of analysis, and greater celerity in their execution.

In the course in Agriculture, the analytical part of agricultural chemistry begins in the fall term of the sophomore year, and comprises analysis in the wet way and with the blowpipe. The qualitative analysis should be completed in two terms of this year, so that all the time given to the subject in the junior and senior years may be devoted to quantitative analysis. This quantitative work begins, as in Chemistry and Physics, with general practice in the determination of bases and acids by gravimetric and volumetric methods. The chemical examination of fertilizers, soils, and agricultural products occupies the remainder of the course.

In the Medical Preparatory Course, a short course of qualitative and quantitative analysis in the wet way is given, which may carry the student far enough to qualify him to examine animal liquids by chemical methods for assistance in the diagnosis of disease. The amount of practice necessary for acquiring merely the rudiments of chemical analysis renders it impracticable to accomplish more than this in the time allotted in the course. Students intending to study medicine who have more time for chem-

ical practice can take a longer and more thorough course, which includes a better foundation in quantitative work, and a wider application of the proficiency thus gained to the chemical examination of animal substances and articles of food and drink, and to medical jurisprudence.

#### CHEMICAL LABORATORY.

The new building for the department of Chemistry and Physics, completed during the summer of 1883, and now fully occupied, contains a museum, a library, laboratories, and lecture-rooms, and is thoroughly equipped with the most recent and approved appliances for the proper prosecution of the work of the department.

*Instructors:* Professor Caldwell, Mr. Holton and Mr. Lund.

#### CIVIL ENGINEERING.

The instruction is given by means of lectures and recitations, with drafting, and field and laboratory work. The field work embraces the usual operations and the more recent methods of land, railroad, and subterranean surveying, together with hydrography and geodetic practice; and since 1874 the department of Civil Engineering has been engaged in the surveys of the hydrographic basin of central New York, as a contribution to the geodetic surveys of the United States Government.

Laboratory work is provided in chemistry, mineralogy, metallurgy, geology, physics, and civil engineering.

The students of this department receive instruction in an extended course of mechanics, as applied to engineering, and their professional preparation comprises the following subjects: The location and construction of railroads, canals, and water-works, the construction of foundations, in water and on land, and of superstructures and tunnels; the surveys, improvements, and defenses of coasts, harbors, rivers, and lakes; the determination of astronomical co-ordinates; the application of mechanics, graphical statics, and descriptive geometry to the constructions of the various kinds of right and oblique arch bridges, roofs, trusses and suspension bridges; the design, construction, and application of wind and hydraulic motors, air, electric, and heat engines, and pneumatic works; the drainage of towns and the reclaiming of lands; the preparation of plans and specifications, and the proper selection and tests of the materials used in constructions. As a part of their instruction, students have frequent practice in the preparation of papers on subjects of professional importance.



An elementary course of lectures is given in engineering and mining economy, finance, and jurisprudence.

To meet the growing demand for special training, the five-year course has been arranged, allowing considerable option and diversity of studies to students wishing to pursue special lines of study in bridge architecture, or in railroad, mining, topographical, sanitary, geographical, electrical, or industrial engineering.

The five-year course also offers lines of continuous study of a historical, literary, and scientific character, which may alternate with the prescribed studies, and with architecture, general science, and technology.

As stated elsewhere, students in these courses are required to write essays upon professional subjects.

#### EQUIPMENT.

The special library of the department possesses many valuable works, among them the extensive publications recently presented to it by the French government; and in addition, the resources of the general library are available for the purposes of the department. The engineering laboratories contain various machines, models, and appliances for engineering investigations.

The engineering museums contain the following collections, which receive regular additions from a yearly appropriation:

1. The Muret collection of models in descriptive geometry and stone-cutting.

2. The De Lagrave general and special models in topography, geognosy, and engineering.

3. A nearly complete collection of the Schroeder models in descriptive geometry and stone-cutting, with some of the Olivier models, and others made at the University.

4. The Grund collections of bridge and track details, roofs, and trusses, supplemented by similar models by Schroeder and other makers.

5. A complete railroad bridge of one-hundred-foot span, the model being one-fourth of the natural scale.

6. The Digeon collection of working models in hydraulic engineering.

7. Several collections of European photographs of engineering works during the process of construction; and many other photographs, diagrams, and models.

8. Instruments of precision for astronomical work: a Troughton & Simms' transit, a universal instrument by the same makers



reading to single seconds, three sextants, two astronomical clocks, chronographs, chronometers, two small equatorials, the larger of four and a half inch aperture, made by Alvan Clark, and other instruments necessary to the equipment of a training observatory.

9. For geodetic work, a secondary base-line apparatus, made under the direction of the Coast and Geodetic Survey, and all the portable astronomical and field instruments needed, including sounding machines, deep-water thermometers, heliotropes, etc.

10. Among the coarser field instruments nearly every variety of engineers' transits, theodolites, levels, compasses, omnimeters, and tacheometers, with a large number of special instruments, such as planimeters, pantographs, elliptographs, arithmometers, tachometers, pocket altazimuths and sextants, hypsometers, and meteorological instruments of all descriptions.

For the Course in Civil Engineering see page 62.

*Instructors:* Professor Fuertes and Assistant Professors Church, Crandall and Marx.

## ELECTRICAL ENGINEERING.

The rapid development of the applications of electricity has created a demand for thoroughly trained engineers conversant with electrical science, especially by companies carrying on telegraphy, electrical lighting, electrical supply and transmission of power, electroplating, or the manufacture of electrical machinery and apparatus. Recognizing this demand, at the beginning of the academic year 1883-4, the trustees of Cornell University began to receive students desiring to fit themselves to enter this new and constantly extending field. While the general studies of the new course are mainly those of the departments of Civil and Mechanical Engineering, the special studies of the course embrace the theory of electricity, the construction and testing of telegraph lines, cables, and instruments, and of dynamo-machines, and the methods of electrical measurements, electrical lighting, and the electrical transmission of power.

### EQUIPMENT.

The University possesses a very extensive collection of electrical apparatus, including resistance coils, galvanometers, condensers, and other apparatus for measurements, from Elliott Brothers of London, Siemens & Halske of Berlin, and other makers; the special instruments by Deprez, Siemens & Halske,

Professors Ayrtton and Perry, and Sir William Thompson, for measuring the currents and potentials of dynamo-machines; two large and several small dynamo-machines; electric lamps of several makers; telegraph and telephone instruments; besides magnetometers, dynamometers for measuring power used in driving dynamos, photometers, and other accessory apparatus. Telegraph and telephone lines are available for making tests, and electric light circuits upon the University grounds enable the student to make his experiments under the conditions that obtain in actual practice.

In the new Physical Laboratory every facility is provided for the use of electrical apparatus under the most favorable conditions, and a workshop attached to the laboratory provides for the construction of special instruments for investigations.

For the Course in Electrical Engineering see page 61.

*Instructors:* Professor Anthony and Assistant Professor Moler.

## MARINE ENGINEERING.

At the request of the University, an officer of the engineer corps of the United States Navy has been detailed for the purpose of giving instruction in Marine Engineering. Special work in this subject, under the general direction of the department of mechanic arts, may therefore be taken by such students as desire it.

Such work will include the methods for determining the power necessary to secure a desired speed of ship, and the design of the machinery to supply and use that power, both in general plan and in detail. By means of lectures, students taking this work will be instructed as to the relative advantages of various types of machinery, the causes of deterioration and how to prevent them. The question of high steam pressures and rates of expansion is thoroughly discussed and the limitations both from a thermodynamic and commercial point of view are explained. Special attention is paid to the theory of the compound engine and to its design in practice.

A very complete and valuable set of blue print photographs of working drawings of marine machinery, presented to the Sibley College by the Harlan and Hollingsworth Co., of Wilmington, Del., as well as drawings of machinery of U. S. naval vessels, presented by Chief Engineer Alex. Henderson, U. S.



Navy, give excellent facilities for the study of the best practice in marine engine design.

*Instructor* : Assistant Professor McFarland.

## MINING ENGINEERING.

Although no department of Mining Engineering has yet been formally established, all the main instruction required by a mining engineer is now given, as follows: the professor of civil engineering and his associates pay especial attention to the needs of those intending to connect themselves with the mining industries, giving lectures on tunneling and on the theory and practice of such constructions as are common to the professions of civil and mining engineer; the professor of mechanical engineering and his associates pursue a like course, giving instruction in mining machinery; the professors of general chemistry and mineralogy, and of analytical chemistry, give instruction in metallurgy, assaying, chemical analysis, and cognate subjects; the professors of geology and palæontology give instruction in the theory and classification of ores, and in those branches relating to chemical geology.

## HISTORY AND POLITICAL SCIENCE.

### I. HISTORY.

The aim in the courses of instruction in History is to present, in logical and chronological sequence:

1. *General History, Ancient, Mediæval and Modern*, with especial reference to the political and social development of the leading nations.

2. *The Constitutional History of England*, as that which has most strongly influenced our own.

3. *The Comparative Constitutional and Legislative History of various modern states*, as eliciting facts and principles of use in solving American problems.

4. *The History, Political, Social, and Constitutional, of the United States*, with a systematic effort to stimulate the student to original research into the sources of our national history.

5. *The Philosophy of History*, as shown by grouping the facts and thoughts elicited in these various courses.



## I. GENERAL HISTORY.

The instruction in General History extends through the four years, as follows ;

1. General Ancient, Grecian, and Roman History, beginning with the spring term of the freshman year and continuing through the three terms of the sophomore year.

2. Mediæval History : General History of the social and political development of Europe during the Middle Ages, mainly by instruction in general English history during the sophomore year, and by special lectures in the junior year.

3. Modern History : (a) 1885-6, The history of Germany : fall term, the period of the Reformation ; winter term, from the Reformation to the French Revolution ; spring term, the nineteenth century. (b) 1883-4, The history of France : fall term, from the close of the Middle Ages to the French Revolution ; winter term, the French Revolution ; spring term, the Napoleonic and recent periods.

In connection with the above there are lectures on important points and periods in the history of other modern nations.

*Instructors* : President White, Professor C. K. Adams, and Assistant Professor Perkins.

## 2. ENGLISH HISTORY.

The instruction in general English History is given by recitations from text-books during the entire sophomore year. This is supplemented by frequent lectures on those periods which are of the most importance and those that are more obscure and less fully treated in the text-book.

This is followed by courses of lectures to the upper classes on the growth and principles of the constitution, the aim being to present the great bases of law and policy on which the structure of the English government rests. The early Saxon institutions are described at some length ; and the lectures follow the development of the system from this germ through its leading phases down to modern times. Special attention is paid, during the whole course, to such topics as illustrate the institutions and constitutional history of the United States.

*Instructors* : Professors Goldwin Smith and Tuttle, and Assistant Professor Perkins.

## 3. COMPARATIVE CONSTITUTIONAL AND LEGISLATIVE HISTORY.

This subject is treated, as far as possible, in the courses of lectures upon Modern History in the junior year, and in a special course of lectures during the senior year.

*Instructors:* President White and Professor C. K. Adams.

## 4. AMERICAN HISTORY.

The study of American history extends through the junior and senior years, and for each of those years is a continuous subject. A post-graduate course is also organized, to which such seniors are admitted as have already had one year's work in this department.

*Junior Section.*—The junior section deals with American history from the earliest times to the end of the Revolutionary war. The subject is embraced in the following courses of lectures:

I. Prehistoric America, and the progress of geographical discovery in the western hemisphere from the earliest times to the present. II. European Rivals of the English in American colonization. III. The planting of the English colonies in America. IV. Colonial institutions and ideas,—political, social, educational, religious, industrial. V. Representative men of the colonial times. VI. The American revolution: its causes, progress, and results. VII. The American revolution as interpreted by contemporary American literature.

*Senior Section.*—The senior section deals with American history from the end of the Revolutionary war to the end of the Civil war. The subject is embraced in the following courses of lectures:

I. The history of the constitution in its origin, adoption, and amendments. II. The history of political parties. III. The presidential administrations from Washington to Lincoln, with especial reference to the principles regulating the civil service. IV. The anti-slavery movement, from its origin to its culmination in the civil war. V. Representative Americans of the nineteenth century. VI. Later phases of national progress and danger. (a) Territorial expansion. (b) Lessons from the census. (c) Improvement in the means of communication. (d) The Chinese in America. (e) The Indian problem. (f) The Negro problem. (g) History of Mormonism. (h) Illiteracy.

*Senior-Graduate Section.*—The senior-graduate section deals with American constitutional and political history.

*Instructor:* Professor Tyler.

## 5. PHILOSOPHY OF HISTORY.

The lectures on this subject are given in the winter term of the senior year. Their object is to trace the origin and progress of civilization, and to point out the causes and institutions, civil, social, and religious, which have tended to advance, or to retard its progress. The first half of the course treats of general principles, and the last, of the historic progress of civilization, beginning with the settlement of the Aryan nations in Europe.

*Instructor:* Professor Wilson.

## II. POLITICAL AND SOCIAL SCIENCE.

The division includes the following topics:

1. *Political Economy and Finance.*
2. *Systematic Finance.*
3. *International Law.*
4. *American Law and Jurisprudence.*
5. *Social Science (special subjects).*

## 1. POLITICAL ECONOMY.

The instruction in Political Economy is given by lectures and recitations from text-books in the elements of the science during the winter term of the junior year; and by a course of lectures during the spring term of the senior year, in which practical questions arising in the study of industrial society receive attention. A course of lectures upon the science of finance, embracing a study of the comparative financial administration of constitutional nations and the various sources of public revenue, is given during the senior year. All these courses of lectures are to be supplemented by private reading.

*Instructors:* Professor Wilson and Associate Professor H. C. Adams.

## 2. SYSTEMATIC POLITICS.

The aim of the instruction in this course is to present both the philosophical and the practical side of the subject in a logical order of treatment. It comprises the two general topics of theoretical and practical politics.

Theoretical politics treats of primitive societies, the growth of states, forms of government, history of political literature and speculation, and the philosophy of the state. Practical politics treats of states in their concrete relations, and includes such sub-



jects as constitutional organization, legislation, administration and civil service methods, justice, revenue, military systems, and a comparative survey of existing governments. The historical and the analytical methods are both used, and the object of the course is to make the student acquainted in a scientific sense with the true principles of political organization and practice, as well as with the existing institutions of the great civilized states.

*Instructor:* Professor Tuttle.

### 3. INTERNATIONAL LAW AND DIPLOMACY.

The instruction in this department consists of a course of lectures given during the winter term of the senior year. The course treats, among other subjects, of the history and literature of the law of nations, rules of war, neutrality, prize, embassy, forms of diplomacy, history of American diplomacy, together with descriptions of some of the more famous international disputes in which the United States have been concerned.

*Instructor:* Professor Tuttle.

### 4. AMERICAN LAW AND JURISPRUDENCE.

The course consists of about forty lectures. The first three are devoted to the more general relations of man to government; then follow twelve lectures on the constitution of the United States, and five on the origin and development of international law; then lectures on the rights of persons and of property, with a general discussion of the nature of contracts, partnerships, and corporations; then lectures on crime and criminal law, and the course concludes with four lectures on the legal maxims relating to sovereignty, legislation, customary law, and the judiciary.

### 5. SOCIAL SCIENCE (SPECIAL SUBJECTS).

This course is given during the spring term. It embraces instruction by lectures on the best methods arrived at in this country by the different States and in other countries in regard to legislative, administrative, and other dealings with pauperism in its various manifestations; crime in all its grades by reformatories, prisons and the like; inebriety in its different stages; insanity, whether chronic or acute; illiteracy, whether in city or rural populations; and in general with various subjects of the sort, which demand more intelligent treatment than, as a rule, they have yet received. To supplement such instructions, ob-

servations and investigations will be made by the students choosing this study under the direction of the instructor at various public institutions in Central New York,—nearly the whole range of charitable, reformatory, and punitive effort being represented at such institutions within a short distance of Ithaca.

It is hoped that, as years go on, young men graduated with the practical knowledge thus given, will, in the various professions, and especially in town councils, county boards, and State legislatures, prove of great value to the country by aiding to remove some of the serious evils which have arisen in creating and maintaining various institutions and administration.

*Instructor:* Mr. Sanborn.

For the Course in History and Political Science see page 70.

## LANGUAGES.

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### 1. THE ANCIENT CLASSICAL LANGUAGES.

Greek belongs to the course in Arts, and Latin to the courses in Arts, Literature, Philosophy, and History and Political Science. The distribution in regard to the number of years of required and optional study may be seen by consulting the tabulated statements of those courses. The number of weekly exercises with all undergraduate classes in Greek is three, and in Latin four, with the exceptions noted below. Instruction in Greek and Latin composition accompanies the study of the authors; lectures are occasionally substituted for recitations; and the examinations regularly comprise the translation of passages not previously seen by the student.

#### GREEK.

*The Freshman Class.*—The instruction during the first year is for the most part disciplinary in its methods, the purpose being on the one hand to enable any who may still be lacking in elementary knowledge to make up their deficiencies, and on the other hand to lay a good foundation of general principles. The first term especially is one of probation, a large share of the time is devoted to composition and memorizing, and no attempt is made to finish a stated amount of reading.

*The Advanced Class.*—With the Advanced Class, in which the prescribed work of the second year is combined with optional

work of the third and fourth years, a liberal method of instruction is pursued. It is assumed that the student knows his grammar and has a fair vocabulary at his command, and the main purpose is to cover as much ground of the best literature as can be done consistently with critical reading.

The course of reading is so arranged as not only to admit of no repetition during the four years through which a student may wish to continue the subject, but also to present a just distribution among the various branches of the literature, and as far as possible a natural order of sequence. The author read in the first term of the Freshman year is usually Xenophon, together with Anacreontics memorized for both oral and written practice; the second term, Homer, two or three books, with memorizing of selected passages; the third term, Aeschylus, the Prometheus, Persians, or Seven Against Thebes. For the second year the authors vary, according to a fixed principle, to suit the arrangement of classes explained above.

A table showing the whole course of reading in Greek may be had on application.

For graduate work in Greek see below.

## LATIN.

### FRESHMAN YEAR.

FALL TERM.—Livy.

WINTER TERM.—Cicero's De Senectute; the Odes of Horace (Book I).

SPRING TERM.—The Odes (Books II–IV) and Epodes of Horace.

### SOPHOMORE YEAR.

FALL TERM.—The Agricola and Germania of Tacitus; Roman antiquities.

WINTER TERM.—Terence; the Satires of Horace (Book I); the history of Roman literature (text-book and lectures).

SPRING TERM.—The Satires (Book II) and Epistles of Horace; the history of Roman literature.

### JUNIOR YEAR.

FALL TERM.—The Annals or the Histories of Tacitus: *two-hour optional course*. Cicero's Letters: *one-hour optional course*.

WINTER TERM.—Juvenal: *two-hour optional course*. Cicero's Letters: *one-hour optional course*.



SPRING TERM.—Catullus: *two-hour optional course*. Seneca *one-hour optional course*.

#### SENIOR YEAR.

FALL TERM.—Plautus: *two-hour optional course*. Quintilian: *one-hour optional course*.

WINTER TERM.—Lucretius: *two-hour optional course*. Virgil, Books IX and X of the Aeneid: *one-hour optional course*.

SPRING TERM.—The Letters of Pliny the Younger: *two-hour optional course*. Virgil, the Georgics: *one-hour optional course*.

A graduate class, working under the direction of the professors of Greek and Latin, meets at regular hours. The work of the present year is as follows:

In Greek, (once a week), first term, the Hellenic Orations of Demosthenes, discussion of rhetorical and rhythmical structure. Second term, Pindar, metrical readings and written translations. Third term, iambic verse composition.

In Latin, the critical reading of Livy (once a week); Latin Grammar, and methods of teaching (once a week).

For the course in Arts, which includes both Latin and Greek, see p. 53.

## II. GERMANIC LANGUAGES.

The first two years in German are specially intended, besides preparing the student for progressive and independent work in the language, to give those who have not a classical training some grammatical discipline, and an insight into the growth and relations of Indo-Germanic speech. Instruction is also given to optional classes in the more advanced study of the Germanic languages.

#### GERMAN.

During the whole of the freshman year Whitney's Grammar and Reader are used, accompanied by Ahn's (Fischer's) exercises in writing German. In the fall term a knowledge of the inflections is gained, the strong verbs are begun, and stories and ballads are translated, with daily exercises in writing. In the winter term the strong verbs are completed, the syntax of nouns, the uses of the moods, and the arrangement of sentences are studied, with advanced translation and the writing of German. In the

spring term, with advanced translation and writing, exercises in translation at sight are also given, and the relation of English to German is traced by the application of Grimm's law, in connection with the special study of etymology.

In the fall term of the sophomore year one of Schiller's or Goethe's dramas is studied, followed in the winter term by extracts from Goethe's or Schiller's prose. In the winter term a course in scientific German is also offered, as an alternative. In the spring term Goethe's *Hermann und Dorothea*, Lessing's *Minna von Barnhelm*, or some similar work, is read. The work of the fall term is chiefly philological, while in the winter and spring terms more attention is paid to literary biography and reading at sight.

During the junior and senior years occur lectures and recitations, with optional classes, on German history, literature, and mythology, and courses are given varying from year to year, embracing the works of the leading authors. Classes are also formed in composition and conversation, and recent dramatic literature and the works of living novelists are read.

#### OTHER GERMANIC LANGUAGES.

Special instruction is offered in Gothic, Old Saxon, Old and Middle High German, and the Scandinavian and Netherland languages.

In Gothic, the text-books are Heyne's, Bernhardt's and Skeat's editions of *Ulfilas* and Braune's *Grammar*; in Old Saxon, the *Heliand*; in Old German, Otfried's *Krist*, and Braune's *Althochdeutsches Lesebuch*, with lectures on the early German alliterative poetry and the later forms of German verse. In Middle High German the epic, lyric, and didactic poetry is studied, with the addition of prose selections. The Netherland languages are pursued with special reference to the explanation of English forms and idioms, and works in modern Dutch and Flemish are read.

The Scandinavian languages are taught chiefly by means of German text-books. In Icelandic, use is made of Wimmer's *Altnordische Grammatik*, and Vigfusson and Powell's *Icelandic Prose Reader*, and lectures are given on Scandinavian history and literature.

*Instructors:* Professors Hewett and H. S. White, and Mr. Krueger.

## III. ROMANCE LANGUAGES.

## FRENCH.

Joynes-Otto's Elementary French Course is studied during the fall term of the freshman year. Translation is begun in the same term and continued in connection with grammatical exercises throughout the year. The amount read is the equivalent of two of Bôcher's Modern French plays and Lacombe's *Petite Histoire du Peuple Français*. In the sophomore year two courses are offered, one in general literature, embracing both the modern and classical periods; and one in modern French, with special reference to its use in practical and scientific studies. In the first course are read such works as Mérimée's *Colomba*, Molière's *Les Femmes Savantes*, and Voltaire's *Siècle de Louis XIV*; one hour a week in the winter term is devoted to composition, and one in the spring term to conversation. In the second course are read such works as Garigue's *Simplex Lectures sur les Sciences, les Arts et l'Industrie*, and the periodical, *La Nature*.

Optional courses are given during the junior and senior years in Old French and in recent literature and literary history.

## ITALIAN.

During the first year Ricci's *Italian Principia* is used with Lardelli's *Letture Scelte* and Manzoni's *I Promessi Sposi*. In the second year selections are read from Dante's *Inferno*, and from Boccaccio and Petrarch.

## SPANISH.

Knapp's *Grammar of the Modern Spanish Language* is used during the fall term; and Knapp's *Modern Spanish Readings* in the winter and spring terms.

*Instructors:* Professor Crane, and Messrs. S. J. and P. D. Brun.

## IV. ORIENTAL LANGUAGES.

None of the languages here included are required for any baccalaureate degree conferred by the University. The Professor of Sanskrit and Living Asiatic Languages gives, in addition to special instruction, lectures bearing upon ethnographical philology and general linguistic science. Instruction is also given in the Hebrew language when it is desired.

*Instructors:* Professors Roehrig and Wilson.



## MATHEMATICS AND ASTRONOMY.

The instruction offered by this department has a three-fold purpose: (1) To aid in developing certain powers and habits which every good citizen needs, whatever his vocation—the power and habit of precise definition, of sustained exact and independent reasoning, of clear statement of the grounds of his own convictions, and of successful application of theory to practice. (2) To present the fundamental relations of space and of number, and the structure of the system of worlds in which we live. (3) To meet the special needs of students in technical and scientific courses.

Every regular course, except natural history, includes geometry, algebra and trigonometry; the courses in architecture, mechanic arts, civil and electrical engineering, include analytic geometry and calculus; that in history and political science includes the theory of probabilities and statistics; most of the general scientific courses include analytic geometry and astronomy; and optional honor classes are formed for the solution of problems, etc. All these subjects, and the higher mathematical studies, are open as optionals or as extras to any one fitted to take them.

The "Course in Mathematics" [page 67] is designed to give a broad general training to those intending to be teachers and investigators. It therefore embodies more of literary work than is usual in scientific courses. About half of it consists of such mathematics, partly from French or German books, as forms a necessary introduction to modern investigations; while the rest consists of other scientific and literary studies, and of history or other optional work not mathematical.

To graduates and special students, instruction is also offered in the theory of numbers, quantics, and celestial mechanics. Large and constantly increasing facilities for special research are afforded by the University Library; which contains over 4,500 volumes on mathematics and the allied sciences, including many of the most important series of transactions and mathematical journals.

The frequent reviews, and the examinations on past or current work held during the term and at its close, are meant to test the student's command of general principles and methods as well as of details.

*Instructors:* Professors Oliver and Wait, Assistant Professor Jones and Mr. McMahon.

## MECHANIC ARTS.

In 1870 the Hon. Hiram Sibley, of Rochester, N. Y., provided for the erection of a suitable building for the department of Mechanic Arts.

He also gave ten thousand dollars for increasing its equipment of tools, machines, etc., and soon after made a further gift of thirty thousand dollars for the endowment of the professorship of practical mechanics and machine construction.

During the years 1883 and 1884 he gave more than sixty thousand dollars for the purchase of models,—the extension of the present Sibley building, and the building and equipping of a complete set of workshops.

These comprise a foundry, a machine shop, a wood-working and pattern shop, a smithy, and mechanical laboratory. Adjoining these are a printing-office, a stereotype foundry, a boiler-house and janitor's quarters. These shops will be completed and ready for use by January, 1885.

The machine shop is supplied with lathes of various kinds, planers, grinding, drilling, and shaping machines, a universal milling machine, fitted for cutting plane, bevel and spiral gears, spiral cutters, and twist drills, with additional tools and attachments for graduating scales and circles and for working various forms and shapes.

In addition to the usual hand and lathe tools, there are instruments of the greatest accuracy consisting of standard surface-plates, straight-edges and squares of various sizes; a standard measuring machine reading to the ten-thousandth of an inch, a universal grinding machine for producing true cylindrical and conical forms, and a set of Betts' standard gauges.

The foundry is equipped for giving thorough instruction in loam and sand moulding, and the casting of iron and brass. The cupola for melting iron is a Colliau's improved, with a capacity of one ton per hour. There are also a crucible furnace for melting brass, a core oven, a rattler, and the other usual foundry appliances.

The smithy contains ten forges of the most approved pattern, and corresponding outfits of smith's tools. The instruction embraces forging, welding, tempering, etc.

The wood-working and pattern shop will be thoroughly equipped for teaching the use of all ordinary tools and machines for working wood. Particular attention will be paid to the details of pattern-making.



The mechanical laboratory will be devoted to making tests and experiments. The apparatus will consist of experimental engines and boilers, machines for testing the strength of materials, friction and lubricants, friction and transmitting dynamometer, etc., etc.

The scope of the work in this laboratory will be understood by the following illustrative list of experiments:—the determination of the horse power of engines, adjustment of indicator and rig, examination and adjustment of valve gear and link motion, determination of limiting speed from consideration of weight of reciprocating parts, balancing engine, determination of cost of power in coal and water per I. H. P. per hour, test of dryness of steam by calorimeter, value of non-conducting coverings of steam pipes, tests of efficiency and evaporative power of boiler. tests of steam pumps, injectors, etc., etc. Besides other apparatus to be purchased soon, the laboratory is now supplied with a 20-ton Riehlé testing machine, arranged for testing strength of materials by tension, compression, and transverse strain, Wood's steam gauge tester, Richardson's, Thompson's Crosby's and Tabor's indicators; Amsler's planimeter, revolution counters, steam gauges, injectors, inspirators, and safety valves; Blake's, Blakesley's, Deane's, Miller's, and Woodworth's steam pumps; Allen's, Chase's, Gardner's, Lynde's, Shive's, Waters', and Wright's governors.

In short, the aim of all the instruction in shop work is to make the student, as far as time will permit, acquainted with the most approved methods for the construction and inspection of machinery. Every student is required to devote nine hours per week to work in the shops, or about thirty days during each year.

The course of instruction in mechanical drawing is progressive, from geometrical drawing to designing of machinery and making complete working drawings. The aim is to familiarize the student with the methods adopted in the best drawing offices of the country. This end is furthered by working drawings and blue prints from our own most prominent engine and machine builders, whose practice is thus at once shown in the clearest way. Several hundred drawings selected from the best technical schools abroad also aid in this work.

The theoretical instruction in the department comprises a very thorough course in the kinematics of machinery after the Reuleaux's system, thermodynamics and the theory of steam, air, and gas engines, a critical examination of the valve gears in



general use and their design, and, in connection with the course in drawing, of the theory of machine design. To illustrate this work there are a complete collection of Reuleaux's kinematic models, Baldwin's link and valve motion model, and a large collection of brass, iron, and wooden models, illustrative of mechanical principles.

The Sibley College, a building 166 feet by 40 feet, and three stories high with basement, contains the lecture, recitation and drafting rooms of the department of Mechanic Arts, as well as rooms for the display of models and drawings of machinery.

*Instructors:* Professors Morris, Webb, Assistant Professor McFarland and Mr. Clinton.

For the Course in Mechanics see p. 66.

## MILITARY SCIENCE.

Pursuant to the act of Congress creating the land grant on which the Cornell University is founded, and the act of the legislature of the State of New York assigning that land grant, instruction is provided in Tactics and Military Science. Drill and Military Science are "a part of the studies and exercises in all courses of study and in the requirements of all students in the University" during the fall and spring terms of the freshman and sophomore years and the winter term of the senior year. Foreigners, laboring students, and those physically unfitted therefor are excused from drill. Students are required to provide themselves with the University uniform, unless excused on account of inability to procure it, and they are held accountable for loss or injury to the arms and other public property issued to them.

The course extends through the fall and spring terms of the first two years, and the winter term of the senior year. During the first two years there are three exercises a week, of an hour each; those of the senior year consist of a regular course of lectures on the general operations and science of war, twice a week.

The subjects treated are: *The Art of War*.—To comprise the history and principles of grand and minor tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy, with historical illustrations; and accessory operations of war. *Military Engineering*.—To comprise the principles of military topography; the effect of

projectiles; the principles of fortification, with their application to field works; military mining; the attack and defense of works; and the construction of military roads and bridges. *Military Law*.—To comprise the origin, principles, and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction, and procedure of courts-martial, courts of inquiry, military commissions, and military boards.

Any student who has satisfactorily performed all the duties required for the first two years, and who is qualified therefor, may be selected for the place of a commissioned officer if needed. For the performance of his duties as a commissioned officer in the junior or senior year he is entitled to a credit of three recitations a week for each term; and, at graduation, he may receive a certificate of military proficiency with his diploma.

The practical military exercises include: *Infantry Tactics*.—To comprise the schools of the soldier, company, and battalion; with skirmishing, the forms of parade, and the duties of guards. *Artillery Practice*.—To comprise at least the school of the piece and section for the field guns, with such further artillery instruction as may be found practicable. *Special Exercises*.—To comprise recitations at such times as may be prescribed.

*Instructor*: Professor Schuyler.

## NATURAL HISTORY.

### I. BOTANY.

The following courses of instruction are offered:

1. *Elements of Botany*.—Designed as a course for general students, and as an introductory course for special students; twenty lectures and twenty hours of work in the laboratory in the study of structure and the determination of species. Counts three hours per week in the spring term.

2. *Field Work*.—Consists of the collection, determination, pressing and mounting of not less than fifty species, to count two hours per week. Additional time is allowed for additional work.

3. *Compositæ and Gramineæ*.—Consists of a study of these two orders in regard to their structure, affinities, distribution and uses. Twelve lectures with sixty hours of laboratory work, to count as three hours in the fall term.

4. *Systematic and Economic Botany*.—A study of the principles of classification, with a somewhat critical study of several of the more important natural orders. Thirty lectures to count as three hours per week in the winter term. This course is given once in two years, alternating with (6).

5. *Vegetable Histology*.—Consists of the study of the minute structure of plants. A systematic course of laboratory work, with introductory lectures, counting two hours per week in the winter term.

6. *Vegetable Physiology*.—A course of thirty lectures in the winter term, counting three hours per week. Given once in two years, and alternating with (4).

7. *Higher Cryptogams*.—A course of laboratory work with introductory lectures. Two hours per week in the spring term.

8. *Lower Cryptogams*.—An outline study of the whole group, with a more special study of fungi. Twenty-five lectures, with sixty hours of laboratory work, counting four hours per week in the fall term.

9. *Principles of Plant-culture*.—A study of plants with reference to their adaptation to cultivation, the changes produced by culture, and the origin and characteristics of artificial varieties. Twenty-five lectures in the fall term, counting two hours per week. This course is offered once in two years, alternating with (10).

10. *Arboriculture and Forestry*.—A course of lectures with reading and special association work, counting two hours per week in the fall term. Offered once in two years, alternating with (9).

11. *Woody Plants*.—A field study of the woody plants of the flora of Cayuga Lake valley, with determination of species, and the preparation and mounting of specimens. Not less than fifty species to count two hours per week for the spring term.

The instruction as indicated above need not be followed in the order named. In some cases, however, the course must be preceded by one or more of the other courses, and in all cases (1) must be taken first.

In addition to the above instruction, special work will be offered to students who have taken the whole or a large share of the foregoing courses, and who show a sufficient preparation for such work.



## HERBARIUM AND APPARATUS.

The means of illustrating the instruction in Botany include the Herbarium, estimated to contain fifteen thousand species; two series of models, the Auzoux and the Brendel; the full set of wall maps of Achille Comte, and the botanical charts of Professor Henslow; a lime lantern with five hundred views, illustrating different departments of Botany; twenty compound and dissecting microscopes; a collection of fruits, barks, cones, nuts, seeds, fibers, and various dry and alcoholic specimens; a general collection of economic vegetable products, and above a thousand specimens of the woods of different countries. Besides these, the large conservatories and gardens, and an uncommonly rich native flora afford abundant material for illustration and laboratory work.

Special students in agriculture, not candidates for a degree, are received for one, two or three years. Such students must devote at least two-thirds of their time to studies immediately connected with agriculture.

*Instructors:* Professor Prentiss and Assistant Professor Dudley.

## II. GEOLOGY AND LITHOLOGY.

Instruction is given in general and economic geology and lithology by means of lectures, laboratory practice, and field work. The lectures consist of a course on general geology in the fall term, and a course on economic geology in the winter term.

The laboratory work consists of a progressive series of exercises in determinative lithology, for which at least one term of previous work in the mineralogical laboratory is desirable; and of exercises in the preparation of geological sections and maps from the data furnished by government reports and by study in the field. During the fall and spring terms there are frequent excursions to points of geological interest and instruction is given in field work.

To advanced students, opportunities are offered for the microscopic investigation of minerals and rocks, and for the extended study of important mineral districts, with the preparation of reports thereon and discussions of the metallurgical methods and appliances adapted to their products. The rocks of Ithaca and its neighborhood afford ample material for study and original research.

## LABORATORY.

The laboratory is well furnished with the appliances needful for successful study. Among other things, it has numerous maps, wall tablets, engravings of geological objects, and magic-lantern slides. Large and important additions have also been made during the past year to the lithological and stratigraphical collections.

*Instructor* : Professor S. G. Williams.

## III. PALÆONTOLOGY.

Instruction is given as follows: by laboratory work throughout the year; by excursions during the fall and spring terms to the rich fossiliferous localities in and about Ithaca; and by lectures on systematic palæontology in the winter term.

The elementary work comprises the observation and recording of facts, the collecting of material in the field, the critical study of the literature, and the classification in the laboratory of invertebrate fossils from all parts of the world.

Exceptional facilities are offered for advanced work in the interpretation of fossil forms as marks of geological age and sequence; in the study of faunas, their conditions and distribution; and in the critical study of species and genera, their characters, relations, and modifications as exhibited in the faunas and floras of the past.

## MUSEUM OF PALÆONTOLOGY.

The museum comprises the following collections:

1. The JEWETT COLLECTION, accumulated by the late Col. Jewett when curator of the State Cabinet of Natural History. This collection is especially rich in New York fossils, containing many of the original specimens described in the State reports, and not a few unique specimens.

2. A fair representation of the rich faunas of the cretaceous and tertiary formations along the eastern and southern parts of the Union, and a large number of characteristic English and European fossils.

3. A fine series of English mesozoic fossils; of tertiary fossils from Santo Domingo; of pre-glacial fossils from Sweden; and numerous smaller collections from various typical localities in our own country.

4. The Ward series of casts.

5. The unique collections from Brazil, made by Prof. Hartt and party on the Morgan expedition, containing the original specimens; and a great number of duplicates.

Numerous additions have been made during the past year, making the museum more complete in ichthyosauri and other vertebrate remains, in Trenton trilobites, and in the fauna of the Upper Devonian.

*Instructor:* Professor H. S. Williams.

#### IV. VERTEBRATE ZOOLOGY.

The title likewise includes Human Physiology and Hygiene, Microscopy, and Comparative Anatomy. The instruction is by lectures, demonstrations, laboratory practice, and field work, as follows:

1. *Hygiene*.—Early in the fall term are given six lectures upon the personal care of health, and upon emergencies. Among other practical matters students are shown how to check bleeding, and how to practice the best methods for resuscitating the drowned.

2. *Human Physiology*.—The thirty-six lectures treat chiefly of the subjects not included in the entrance examination, the cellular structure of the body, the phenomena of nervous and muscular action, the vaso-motor system, and the structure and functions of the brain. They are illustrated by a life-sized manikin and other models, by numerous anatomical preparations, by diagrams, and by painless experiments upon the frog and cat. Each student also examines, through the microscope, about thirty preparations of the tissues, including the living amœba, cilia in action, and the circulation in the frog's foot and necturus' gill.

3. *General Vertebrate Zoölogy*.—At one-third of the thirty-six exercises the student examines and dissects representative forms, including branchiostoma, lamprey, shark, perch, catfish, necturus, frog, turtle, fowl and cat. The lectures are illustrated by a full set of Auzoux models, by diagrams, and by the free use of the zoölogical collections.

4. *The Brain*.—A course of twenty lectures is devoted to the anatomy of the brain, human and comparative. Practical work is done both in dissecting and in examining the literature of the subject.



5. *Anatomical, Microscopical, and Physiological Technology.*—The forty lectures upon these subjects are accompanied by practical demonstrations of all the methods presented, and these methods are employed by the student in the laboratory.

LABORATORY PRACTICE.—This varies with the needs of the student and the extent of his preparation. Usually, as a basis for other work, the skeletons of man and the domestic cat are studied, and some of the bones are drawn and described by the student. He then dissects some of the muscles, vessels, and nerves. In the winter term, the methods of microscopical manipulations are learned, and the tissues of the cat, frog, and necturus are examined: In the spring term the student examines the brain, heart, and other viscera of the cat, and performs for himself the simpler physiological experiments. Ordinarily, laboratory work can be commenced only at the beginning of the year, and the student must have had instruction in drawing.

After the first year the student, according to his purposes, dissects other vertebrate animals, or human subjects. There are special facilities for the study of the brain, heart, and early stages of development.

FIELD WORK.—During the fall and spring terms the students are occasionally accompanied by their instructors to the field or lake in order to observe living animals, and to learn the methods of their capture and preservation.

MUSEUM.—The vertebrate collections are as follows: About thirty-five hundred examples of about twenty-four hundred species of entire animals in alcohol. Nearly half of the specimens are fishes collected in Brazil by the late Prof. C. F. Hartt; the remainder include series of named fishes from the Smithsonian Institution and the Museum of Comparative Zoölogy, representatives of the general North American fauna, and of the local fauna, and rare forms from various parts of the world. Among the last are the following: Chimpanzee, orang, dingo, pangolin, sloth, ant-eater, armadillo, ornithorhynchus, eehidna, jacana, sphenodon, monitor, heloderma, crocodile, alligator, draco, axolotl, proteus, megalobatrachus, siren, amphiuma, pipa, ceratodus, protopterus, flying-fish, polypterus, calamoichthys, thalassophryne, chimæra, cestracion, myxine, bdellostoma, and branchiostoma.

About twenty-eight hundred anatomical preparations, including mounted skeletons of man, gorilla, lion, panther, camel, porpoise, sloth, kangaroo, ostrich, apteryx, alligator, draco, frog, cryp-

tobranchus, necturus, cæcilia, and amia; more than six hundred preparations of the brain; large series of dissections of the lamprey, necturus and cat; embryos or young of man, ape, leopard, opossum, kangaroo, manatee, dugong, peccary, lama, sea-lion, bat, alligator, necturus, amia, lepidosteus, shark, skate, and domesticated animals.

About eight hundred microscopical preparations, chiefly from the cat, frog, and necturus.

More than one thousand mounted skins, including orang, tiger, otter, moose, camel, beaver, hyrax, centetes, galeopithecus, armadillo, porpoise, koala, wombat, kangaroo, echidna, ornithorhynchus, emeu, apteryx, boat-bill, penguin, gavial, crocodile, rattlesnake, heloderma, megalobatrachus, ceratodus, cestracion, saw-fish, gar-pike, polypterus, etc.

Besides the papier mâché models by Auzoux mentioned above there are several Bock-Steger models in plaster, a Buechi model of the brain, and wax models by Weisker as follows: the brain cavities, the pelvis, the diaphragm, the development of the frog, trout and branchiostoma.

In the arrangement of the collections reference has been had to the exemplification of zoological and morphological ideas, as the unity of general structure under diversity of form and mode of life in the branch and within each class, the resemblances between members of different classes, the existence of apparently useless organs, etc. Among special series are placed together the vertebrates inhabiting the neighborhood, all venomous forms, etc.

*Instructors:* Professor Wilder and Assistant Professor Gage.

## V. ENTOMOLOGY AND GENERAL INVERTEBRATE ZOOLOGY.

Owing to the economic importance of the study of insects, and to the difficulties attending a thorough study at a distance from the sea-shore of any group of marine animals, more attention is given to entomology than to any other division of invertebrate zoölogy.

### GENERAL ZOÖLOGY OF INVERTEBRATES.

There are three exercises per week during the fall term. Two of these are lectures; and the third consists of an examination by the students of specimens illustrating the subjects discussed in the lectures. At these practical exercises the minute forms of animal life are examined microscopically; and each stu-



dent dissects specimens of the larger typical invertebrates, including squid, clam, ascidian, gephyrea, starfish, sea-urchin, crayfish, and grasshopper.

Those students who wish to pursue the subject farther, after taking the above course, are admitted to the laboratory. Here the greater part of the work indicated in Brooks' Handbook of Invertebrate Zoölogy is performed as a basis for more advanced study. From this point the work varies with the needs of the student. The laboratory is open during the fall and spring terms.

#### ENTOMOLOGY.

In addition to the course on economic entomology described on page 75, there are special facilities for advanced work in systematic entomology, insect anatomy, and the study of the life-histories of insects. The entomological laboratory is open during the fall and spring terms and the summer vacation.

*Summer Course in Entomology.*—During the summer vacation a course of instruction will be given in entomology, including both laboratory and field work. Any one not already a member of the University desiring to join this class should make application to the Professor of Entomology as early as June 10th. The attention of such persons is called to the rule respecting the admission of special students without examination, and to the fact that tuition is free to college graduates.

**COLLECTIONS OF INVERTEBRATES.**—1. The general collection of invertebrates comprises a small but well selected series of forms representing all of the larger groups. In this collection there is a nearly complete set of the duplicates distributed by the U. S. National Museum, many specimens collected on the coast of Brazil by the late Professor C. F. Hartt, and specimens from Florida and the West Indies, collected by Dr. Wesley Newcomb.

2. The Newcomb collection of shells embraces more than eighty thousand examples of more than twenty thousand varieties, representing at least fifteen thousand species.

3. There is in the collection a set of the Auzoux models, and of the glass models made by Blaschka.

4. The biological and systematic collections of insects are described elsewhere under the general head Agriculture.

For the Course in Natural History see page 68.

*Instructor:* Professor Comstock.



## VI. PRELIMINARY MEDICAL EDUCATION.

There is no medical department in the University, but special facilities are afforded those who wish their course to be of direct use in the study of medicine.

The Faculty believe that the crowded and difficult curricula of the medical schools should be preceded, when possible, both by a broad general education, and by a special and practical training in certain branches. They therefore strongly advise those who intend to become physicians to pursue some one of the full courses, and then to become resident graduates, reviewing physiology and chemistry, attending the lectures in veterinary science, and taking laboratory work in chemistry and anatomy.

When only four years are available, the courses in Natural History, Science, and Science and Letters afford more or less time for laboratory work, especially in the senior year.

In case the student can remain but two years, he is advised to take the two-year Course Preparatory to the Study of Medicine, which embraces the branches best calculated to serve as the basis of a proper medical education.

Finally, special students are received for a shorter period than two years, if fitted to undertake the lectures and laboratory work.

For the Course Preparatory to the Study of Medicine see page 70.

## PHILOSOPHY AND LETTERS.

## LITERATURE.

English Literature, and Rhetoric and General Literature, form a part of each of the general courses of study, either as required or as optional work, the matter being distributed as shown in the tabulated statements of those courses.

1. *ANGLO-SAXON AND ENGLISH LITERATURE.*

## SPECIAL COURSE.

## SOPHOMORE YEAR.

FALL and WINTER TERMS.—Anglo-Saxon grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric.

SPRING TERM.—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

## JUNIOR YEAR.

FALL TERM.—Chaucer's *Canterbury Tales*, with lectures on the English of the XIIth to the XIVth centuries.

WINTER TERM.—Elizabethan English, on the basis of selected plays of Shakespeare.

SPRING TERM.—Hales' longer English poems (from Spenser to Shelley).

## SENIOR YEAR.

FALL and WINTER TERMS.—Lectures on Shakespeare and cotemporary dramatists.

SPRING TERM.—Reading by the professor, from XIXth century literature.

## GENERAL COURSE.

## JUNIOR YEAR.

FALL TERM.—Lectures on English literature, from Chaucer to Shakespeare, inclusive.

WINTER TERM.—Lectures on English literature, from Milton to Cowper, inclusive.

SPRING TERM.—Lectures on English literature of the nineteenth century.

A syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

Three lectures a week are given throughout the year.

It is sometimes found advisable to depart from the chronological order, and to begin with the lectures of the winter term, as given above, or of the spring term.

## *II. RHETORIC, GENERAL LITERATURE, AND ORATORY.*

The course in rhetoric, general literature, and oratory extends through the four years.

The work of the freshman year embraces the principles of elementary rhetoric, including diction, the properties of the sentence, the structure of paragraphs, figures of speech, and the history and elements of the English language. In addition to recitations on the topics discussed, each student every week prepares a written exercise.

The sophomore year takes up the study of narration and description, and includes the writing of essays, which, after correction, are returned to the student to be rewritten. Elocution and exercises in declamation are optional during the winter and spring terms.

The junior year includes exposition and advanced rhetoric. Original themes and orations are delivered before the class, after private criticism by the professor. During the spring term, lectures are given on oratory and orators, the themes and orations being on related topics.

The senior year continues the delivery of themes and orations and takes up the study of general literature, which is taught entirely by lectures and collateral reading. The lectures are on topics connected with the history of literature, its different periods, and the leading representative essayists and orators. Optional classes are formed for the special study of Shakespeare, Demosthenes, and the masters of English prose style, and for practice in oral discussion and extempore speaking.

#### MORAL AND INTELLECTUAL PHILOSOPHY.

Instruction in Philosophy begins in the fall term of the junior year. During that term it comprises a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge; and during the winter term, the study of moral philosophy, theories of morals, and the development of moral sentiments. In the spring term the subject is logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

The subject during the fall term of the senior year is the history of philosophy, and the progress of knowledge from its beginning in Greece to the present day, with criticisms on the methods of philosophy and transcendental logic.



## THE UNIVERSITY LIBRARY.

The Library contains about fifty-one thousand two hundred volumes, besides fifteen thousand pamphlets. It is made up chiefly of the following collections, increased by annual additions of from three thousand to five thousand volumes: a selection of about five thousand volumes purchased in Europe in 1868, embracing works illustrative of agriculture, the meehanic arts, chemistry, engineering, the natural sciences, physiology, and veterinary surgery; THE ANTHON LIBRARY, of nearly seven thousand volumes, consisting of the collection made by the late Professor Charles Anthon, of Columbia College, in the aneient classical languages and literatures, besides works in history and general literature; THE BOPP LIBRARY, of about twenty-five hundred volumes, being the collection of the late Professor Franz Bopp, of the University of Berlin, relating to the oriental languages and literatures, and comparative philology; THE GOLDWIN SMITH LIBRARY, of thirty-five hundred volumes, presented to the University in 1869 by Professor Goldwin Smith, comprising chiefly historical works, and editions of the English and ancient classics—increased during later years by the continued liberality of the donor; the publications of the Patent Office of Great Britain, about three thousand volumes, of great importance to the student in technology and to seientific investigators; THE WHITE ARCHITECTURAL LIBRARY, a eollection of over a thousand volumes relating to architecture and kindred branches of science, given by President White; THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, presented by the late Hon. William Kelly, of Rhinebeck; THE CORNELL AGRICULTURAL LIBRARY, bought by the Hon. Ezra Cornell, chiefly in 1868; THE SPARKS LIBRARY, being the library of Jared Sparks, the late president of Harvard University, consisting of upwards of five thousand volumes and four thousand pam-

phlets, relating chiefly to the history of America; THE MAY COLLECTION, relating to the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Rev. Samuel J. May, of Syracuse.

The Library is a circulating one so far as the members of the Faculty are concerned, and a library of reference for students. Undergraduates have free access to a collection of cyclopædias, dictionaries, and works of reference in the various departments of study, but they apply to the librarian for other works desired. Graduate students are admitted to the alcoves. And, upon the recommendation of the professor in any department, students of the senior and junior classes, engaged in special work in that department, will be granted access to the shelves for purposes of consultation.

The Library is managed by a body known as the LIBRARY COUNCIL, which consists of seven members, as follows: The President of the University and the acting Librarian, *ex officio*, one trustee chosen by the Board, and four professors nominated by the Faculty and confirmed by the Board. The President of the University is *ex officio* chairman of the council. The elected members hold office one year.

By the will of Mrs. Jenny McGraw Fiske, who died in October, 1881, the Library received a specific bequest and was also made residuary legatee. From this source there has been paid to the University up to the present time about \$700,000; and the income from this fund, known as the McGraw Library Fund, when it becomes available will be applied to the support and increase of the Library.

THE LIBRARY, a bulletin, is issued at intervals and contains classified lists of recent accessions, and of books in various departments, as well as other bibliographical matter intended to assist students in their use of the Library.

## THE MUSEUM OF NATURAL HISTORY.

The Museum of Natural History includes the collections in American archæology, botany, conchology, entomology, geology, ornithology, palæontology, veterinary science, and zoölogy. Except in botany, entomology, and veterinary science, the collections are deposited in the McGraw building. Some account of the several collections is to be found under the titles of the respective departments. Large additions have been made during the past year, and still larger ones are anticipated.

The Museum is managed by a body known as the COUNCIL OF THE MUSEUM OF NATURAL HISTORY, which consists of the President of the University, the members of the special faculty of Natural History, and the curator of the collection in American archæology, *ex officio*, and one trustee chosen by the Board, to hold office one year.

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## THE MCGRAW-FISKE HOSPITAL.

In the year 1881, the sum of forty thousand dollars was bequeathed by Mrs. Jenny McGraw Fiske as a provision for the care of students who may fall ill during their attendance at the University. It is proposed that a portion of this sum shall be devoted to the erection of a cottage hospital, made comfortable and attractive, and thoroughly equipped in all respects; and that a trained nurse be attached to it, who shall be ready to give attention the moment it may be needed. The carrying out of the intention of the founder is at present delayed by legal proceedings.



## PRIZES AND HONORS.

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### PRIZES.

No student is allowed to be a competitor for any of the following prizes who has not satisfactorily passed all his examinations for the terms preceding that in which he offers himself as a competitor. Nor will the prizes be awarded to any one who so far neglects his other studies as to fail to pass any of his required examinations at the close of the term in which the competition takes place.

#### 1. THE WOODFORD PRIZE.

A gold medal of the value of *One Hundred Dollars*, founded by the Honorable Stewart Lyndon Woodford, late Lieutenant-Governor of the State of New York, will be given annually for the best English Oration, taking into account both matter and manner.

The subjects for the Woodford prize the present year are as follows :

1. William H. Seward's Place among American Statesmen.

2. "History teaches wise men to put trust in ideas, not in circumstances."

3. The Pyramids and the Suez Canal as Records of two different Eras.

4. Modern Civilization in its Bearing upon the Workingman.

5. The Growth of Religious Toleration in the United States.

6. "O Julius Cæsar, thou art mighty yet,  
Thy spirit walks abroad."

7. The Hessians in the American Revolution.

8. Plutocracy in Modern Societies.

9. The Puritan Epoch in New England.

10. The Assimilating Power of the American Nation.

## 2. THE HORACE K. WHITE PRIZES.

Established by Horace K. White, Esq., of Syracuse. To the most meritorious student in Veterinary Science, *Twenty Dollars*; to the second in merit, *Ten Dollars*.

## 3. SIBLEY PRIZES IN MECHANIC ARTS.

Under the gift of the Hon. Hiram Sibley, made in 1884, the sum of \$100.00 will be annually awarded to those students in the Sibley College of Mechanic Arts who shall in the opinion of the Faculty of that institution show the greatest merit in their college work.

## HONORS.

## I. HONORS AT GRADUATION FOR GENERAL EXCELLENCE.

Honors will be granted at graduation to students whose general average in the studies required in their course is honorable.\* These honors will be known as *honors for general excellence*, and will be recorded upon the commencement programme, and in the Register of the year following.

## II. HONORS FOR DISTINGUISHED EXCELLENCE IN SPECIAL SUBJECTS.

Honors will be granted (subject to conditions stated below) for distinguished excellence in any of the following subjects: history, political science, French, German, Greek, Latin, mathematics, chemistry, physics, entomology.

These honors will be conferred by the Faculty, upon the recommendation of the department concerned. They will be known as *special honors in* ——. They will be recorded in the Register of the year following, and *final honors* will also be announced upon the commencement programme of the year in which they are conferred.

Students who desire to be admitted as candidates for these honors must give notice in writing to the Registrar within fourteen days after the day of registration of the spring term. The special examinations for honors will be held in May.

These special examinations will be of two kinds: in certain departments, there will be but a single examination, which will

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\* In the usage of the University, the word "honorable" denotes the highest grade of standing; the word "creditable" denotes the next lower grade.

be open to seniors and graduates. In certain other departments there will be, in addition to this, another examination preliminary to the final one, to be known as the mid-course examination, and to be open to sophomores and juniors, and to seniors who intend to be candidates for final honors after graduation.

Graduates of other colleges studying in Cornell University may, by vote of the Faculty, be admitted to become candidates for these honors.

#### GENERAL REQUIREMENTS.

In order to become a candidate for these honors, the student must satisfy the following requirements:

1. He must have completed all the studies required in his course up to the beginning of the term in which the special examinations are held.

2. At the beginning of the term in which the special examinations are held, his average for his entire work in the studies of his course, exclusive of those in the department in which he seeks for honors, must be creditable.

3. His average for his entire work in the department in which he seeks for honors, up to the beginning of the term in which the special examinations are held, must be honorable.

4. If the department be one in which a mid-course examination is given, the applicant for final honors must have won the mid-course honors.

The candidate must pass with distinguished excellence a special examination upon subjects to be announced in advance, and present any thesis or undergo any other test that may be required of him.

Honors in special subjects will not be granted to a student whose work is unsatisfactory in any of the studies of his course during the term in which the special examinations are held. Nor will they be granted to any but registered students who are pursuing the number of studies required for the term.

The special requirements will be as follows:

#### MID-COURSE HONORS.

*History ; Political Science.*—The candidate must have passed, with an honorable average, the required work in Grecian, Roman, and English history, and must pass, with distinguished excel-



lence, a special examination upon a subject to be announced in advance.

The subject for 1885 is either of the following, at the option of the candidate:

(a) In Modern European History: Reformers before the Reformation.

(b) In English History: The reign of Elizabeth.

*French; German.*—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years, and must also pass, with distinguished excellence, a special examination upon the following subjects:

(a) Translation at sight from French or German.

(b) Translation from English into French or German.

(c) Translation from specified French or German authors.

The subjects for 1885 are, in French: Corneille, *Cinna*; Molière, *L'Avare*, and *les Fourberies de Scapin*; About, *Les Jumeaux de l'Hotel Corneille*, *Madame de Duras*, *Ourika*.

In German: Lessing's *Laokoon*, xxv chapters (omitting notes) Clarendon Press edition; Schiller's *Wallenstein's Tod*; Goethe's *Leiden des Jungen Werthers*.

*Greek; Latin.*—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years, together with the courses in Grecian and Roman history; and must also pass, with distinguished excellence, a special examination upon the following subjects:

(a) Translation at sight from the easier Greek or Latin authors.

(b) Translation from English into Greek or Latin.

(c) Translation of passages from specified Greek or Latin authors.

The subjects for 1885 are, in Latin: Virgil's *Aeneid*, Books IX and X; Livy, Book XXII. In Greek: Plato's *Apology*, and Books IX–XII of Homer's *Odyssey*.

*Mathematics.*—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years of the course in mathematics, with the exception of the subjects of descriptive geometry and mathematical essays, and must also pass, with distinguished excellence, a special examination upon the following subjects:

(a) The solving of geometric problems.

(b) Modern geometry and conic sections.

(c) Algebra, including the theory of equations and the elements of determinants.

(d) Plane trigonometry.

University instruction, covering many of the topics required for this examination, is given to extra classes for two hours a week through the freshman and sophomore years, and candidates for mid-course honors are advised to join these classes.

#### FINAL HONORS.

*History ; Political Science.*—The candidate must be in full and regular standing in the Course in History and Political Science, in Arts, in Literature or Philosophy, with an honorable average in the special studies of that course, and must have won mid-course honors. He must also write a satisfactory thesis upon a subject specified in advance, and pass, with distinguished excellence, a special examination upon that subject.

The subject for 1885 is either of the following, at the option of the candidate:

(a) In American History: Von Holst's Constitutional History of the United States.

(b) In Modern European History: The political development of Germany in the nineteenth century.

For 1886:

(a) In American History: England's commercial restrictions upon the colonies prior to the Stamp Act.

(b) In Modern European History: The building up of the absolute monarchy in France.

(c) In English History: The Constitutional issues involved in the English Revolution of 1688.

(d) In Political Economy: The financial and economical reforms of Alexander Hamilton.

(e) In International Law: The Alabama Question in its historical and its legal aspects.

*French ; German.*—The candidate must have won mid-course honors, and have passed, with an honorable average, an amount of optional work of the junior and senior years equivalent to three hours a week through two years; he must also present a satisfactory thesis, and must pass, with distinguished excellence, an examination upon the following subjects:

(a) Translation at sight from French or German.

(b) Translation from English into French or German.

(c) The political and literary history of some specified period.

(d) Certain specified works of that period.

The subjects for 1885 are, in French: the political and literary history of France under the Second Empire, 1852-1870; and the following authors: Emile Augier (selections from drama); Victor Cherbuliez (selections from novels); Octave Feuillet; and Edmond About (selections). The subject of the thesis required is a study of the literature of the above period with special reference to the influence of the Romantic School.

In German the subjects for 1885 and 1886 are: the political and literary history of Germany from Lessing to the death of Schiller; and the following authors: Lessing (selections from the *Hamburgische Dramaturgie*), Goethe (*Wahrheit und Dichtung*, Books 6-20), the correspondence between Schiller and Goethe. The subject of the thesis required is the *Sturm und Drang* period.

*Greek; Latin.*—The candidate must have won mid-course honors, must have passed, with an honorable average, in three hours a week of optional work for each of the junior and senior years, if the subject be Greek, in four hours, if it be Latin; and must also pass, with distinguished excellence, a special examination upon the following subjects:

(a) Translation at sight from the more difficult Greek or Latin authors.

(b) Translation from English into Greek or Latin.

(c) Translation from specified Greek or Latin authors (with commentary upon the questions of history, archæology, grammar, and etymology involved).

For final honors, 1885, in Greek: Æschylus' *Agamemnon*; Demosthenes' *De Corona*. In Latin: Plautus' *Trinummus*; Terence's *Andria*; the first two *Philippics* of Cicero. For 1886, Plautus' *Rudens*, Terence's *Andria* the second, Cicero fourteenth *Philippics*.

*Mathematics.*—The candidate must have won mid-course honors, and must have passed, with an honorable average, in the junior work in the integral calculus, differential equations, and finite differences, and in the senior work in analytical mechanics; must pass, with distinguished excellence, an examination in special junior work in analytical geometry and calculus equivalent to two hours a term, and in special senior work, equivalent to four hours a term; and must also present a satisfactory thesis.

*Chemistry; Physics.*—The candidate must, by the beginning of his senior year, have completed, with an honorable average, the



required chemical and physical work of the first three years of the course in chemistry and physics, together with not less than half the whole number of hours of laboratory work in chemistry and physics laid down in the fourth year of the course; and in the senior year, besides the remaining hours of chemical and physical laboratory work, he must devote at least seven additional hours a week to advanced work in either the chemical or the physical laboratory, for the preparation of a thesis based upon original investigation; and must pass, with distinguished excellence, an examination upon the subject of his special work.

*Entomology.*—The candidate must have passed, with an honorable average, the regular examinations in the subjects of zoölogy (vertebrate and invertebrate), microscopic technology, botany (the elementary course, including field-work), and entomology (the general course, as laid down in the sophomore and junior years in the course in Agriculture); and must also pass, with distinguished excellence, a special examination upon the results of an investigation of one or more special subjects to which he has devoted an amount of work equivalent to two hours a term for two years.

The subject for 1885 is to be selected from the following list:

- (a) The internal anatomy of the larva of the *corydalis cornutus* Linn.
- (b) The insects injurious to woolen goods in the United States.
- (c) The insects infesting apple trees at Ithaca.
- (d) The insects injurious to wheat in the north-eastern part of the United States.

## UNIVERSITY SCHOLARSHIPS AND FELLOWSHIPS.

The Trustees of Cornell University have set apart, from the money given in 1872 by the Hon. Ezra Cornell, John McGraw, Esq., the Hon. Henry W. Sage, the Hon. Hiram Sibley, and Andrew D. White, a sum amounting to one hundred and fifty-five thousand dollars for the establishment of SCHOLARSHIPS and FELLOWSHIPS to aid meritorious students, both male and female, in the prosecution of their studies at this University. They have also set apart, from the fund contributed by the Hon. Henry W. Sage for the superior education of women, the sum of fifty thousand dollars for the establishment of similar scholarships and fellowships for lady students only.

### SCHOLARSHIPS.

Pursuant to this action, there will be thrown open to competition for all students, annually, at the entrance examinations of the University, six scholarships, of the value of two hundred dollars each, and three of the same value for women only. The total number of scholarships on both these foundations will, therefore, be thirty-six.

Each of these scholarships will be continued for four years, provided the student maintains throughout his course the same high standing with which he enters; and the total amount received by each successful competitor will thus be eight hundred dollars. Students of high ability from the State of New York will have the additional advantage of being able to secure State scholarships, as there is nothing in the University statutes preventing a student from holding both a State and University scholarship.

The rules laid down by the Trustees and Faculty provide that the name of every successful competitor for these scholarships

shall be inserted in the annual Register of the University, together with the name of the school at which he or she was fitted for college, and the name of the Principal by whom he was prepared; and that these names shall remain in the Register as long as he or she retains the scholarship.

It has also been thought best to give the scholarships to the candidates passing the best examination, having regard only to ability. It is believed that in this way alone can the bestowal of the scholarships be put on the proper footing—that is, as an award to merit, and not as a dole to poverty; but the experience of Trustees and Faculty leads them to believe that a system based on merit alone will inure mainly to the benefit of students of small means; since it is a well-known fact that in all the colleges of this country the great majority of the best scholars come, not from the wealthy class, but from those whose circumstances have forced them to feel the need of thrift and energy.

Of the University scholarships, not less than two, and not more than three, as the Faculty may determine, are awarded to students of either sex entering the freshman class, in any course, who, while maintaining a good standing in the other studies required for admission to the Arts course, pass the best examination in the Latin and Greek required for admission to that course, and the remainder—that is to say, not more than four and not less than three of the said University scholarships,—are awarded to those students entering any course in the University, who, while maintaining a good standing in the other studies required for admission to the course, and especially in English Grammar, pass the best examination in the various branches of mathematics required for entrance, namely, in Arithmetic, Algebra, and Geometry.

Students entering the courses in Literature, Philosophy, or History and Political Science, must pass their examination in the Latin required for admission to those courses. But neither the French nor the German required for admission to certain courses will be absolutely required of the candidate until the beginning of the University year 1886–87, though in any case where two candidates are of equal merit in other respects, the one passing the entrance examination in French or German will have the preference.

Of the Sage scholarships for women, one is awarded on the basis of an examination in Latin and Greek, as in the case of the



University scholarships, and the remaining two are awarded on the same basis as the other University scholarships, as above described.

The examinations will be held at or near the same time as the entrance examinations in September, the applicants for scholarships taking the examination papers that are specially prepared for that purpose, samples of which are given in the appropriate place below.

In case of the death of the student who has been appointed to any scholarship, or of his or her forfeiting it by bad conduct or insufficient progress in the studies of his course, the scholarships may be awarded for the remainder of the four years to another student who is in the same class.

#### FELLOWSHIPS.

The Fellowships are seven in number. They are known as the Cornell Fellowship, the McGraw Fellowship, the Sage Fellowship, the Schuyler Fellowship, the Sibley Fellowship, the Goldwin Smith Fellowship, and the President White Fellowship. They are awarded to graduates of this and other Universities who have shown marked ability in some department of study. Each of them secures to the successful competitor four hundred dollars a year for one or (in cases of exceptional merit) for two years. Any young man or woman of really high attainments and character, securing one of the scholarships, and doing thoroughly well in it, may look forward with strong hope to securing one of these fellowships, which will enable him to prosecute post-graduate studies.

The appointments to the Fellowships are made in part or wholly at the close of the academic year, and just before Commencement. In case of our own graduates, the appointments may be made by vote of the Faculty on the general record of the applicant and what they may know personally concerning him, or there may be a competitive examination held as a means of discriminating among several candidates. In the case of graduates of other colleges or universities, the Faculty may depend entirely upon testimonials laid before them, or they may appoint an examination as in the case of their own graduates.

All fellowships imply residence at the University, and the fellowship will be forfeited by either a failure to accomplish satisfactory results in scholarship, or by conduct unbecoming or improper for a member of the University.

## STATE SCHOLARSHIPS.

1. By the Laws of the State of New York, Chapter 585, § 9, and Chapter 684, § 1, the School Commissioners and city Boards of Education of the State of New York are obliged to hold a competitive examination in each year, in each county or city in the State, for the purpose of selecting scholars for the Free Scholarships in Cornell University.

2. The law thus imposing a duty on the School Commissioners and city Boards of Education is understood to *confer a right* upon every student who is qualified to enter the examination and desires to obtain the scholarship, to have such an examination held, and it is believed that any such candidate for the scholarship can enforce his right, if need be, by an appeal to the proper State authorities.

3. Only one examination can be held during the year in any one county or city.

4. This examination *ought to be* held in the summer after the close of the public schools for the season, and before the beginning of the Fall Term of the University.

5. Of the time and place at which the competitive examination is to be held, due public notice should be given at a reasonable time before the examination is to be held.

6. At the examination it is not *necessary* that more than one of the Commissioners or of the School Board should be present, though it is highly desirable that a majority of them, when there is more than one, should be present and take part in conducting the examination.

7. The laws of the State do not designate the studies in which the applicant shall be examined, nor have the Trustees of the University expressed any opinion on the subject; but it is manifestly unfair to impose an examination in any study required for admission to a course which only a part of the competitors expect to enter.

8. Persons to be admitted to the examination must have been educated in the academies and public schools of the State, and *in the county* in which they offer themselves for the competition.

9. It is not understood that the applicants must necessarily be residents of the county in which they seek the scholarship, but only that they should have attended an academy or public school long enough to be entitled to be regarded as having obtained their education, or at least a part of it, in the county. The length of time is not fixed by law.

10. Nor is it regarded as necessary that the applicants shall come from the different Assembly Districts in those counties in which there is more than one such District. And in deciding upon the merits of the competitors and awarding the certificates, no regard need be paid to the Assembly District in which the applicant may have his residence, or may have attended the academy or public school, although the certificate must name the District for which the appointment is made.

11. No student who has once been admitted to the University and received any instruction therein, may be admitted to examinations as a competitor.

12. But it is not understood by the Trustees that the fact that a student who is otherwise qualified to be a competitor and to receive the appointment, ought to be debarred from his right to enter the examination, in consequence of having finished his studies and been out of school for one or two years; especially if during this time he has been occupied in providing the means of defraying his expenses while attending upon the University. Nor do they think that the fact of his having been engaged out of the county during this time and for the purpose above mentioned ought to work to his disadvantage.

13. If, however, the student has been attending school, whether a public or a private school, out of the county, for the period which intervenes between his attendance upon the schools in the county and his application to be received as a competitor, this, it is thought, ought to exclude him from the examination.

14. The certificate of scholarship must in all cases be awarded on the basis of the competitive examination as above described, and not on any examination held otherwise or elsewhere, or on any testimonials obtained from any other source.

15. In all cases of contested or duplicate certificates, the Trustees have decided and instructed their Treasurer to accept



the first certificate that is in due form and granted by the proper authorities in the several counties in said State whereby free scholarships are granted to the said University. The University proposes to leave all questions as to the regularity of the proceedings and the rights of the respective parties that may be claimants for the certificate to be adjusted in the county from which the student comes and by the authorities that reside there.

16. In case any student to whom a certificate has been awarded has died, resigned his certificate, or been expelled from the University, a new certificate, which may state the facts in the case, may be given by the Commissioners or Board of Education of the county, to one of those who were present and competitors at the examination on which the certificate was originally awarded, always giving preference to competitors in the order of superiority of scholarship.

17. The certificates thus given are good for four years from the time when the examination was held. And in case of a new certificate, as above provided, the certificate will be accepted for only that portion of the four years which remains unexpired.

18. No allowance will be made in any case for absence or non-attendance upon the University by any student holding a certificate of State Scholarship. His certificate secures him free tuition for only that part of the four years during which he is in attendance upon his University duties.

19. It will be seen from the above statements that only one examination and only one appointment can be made for any one year for the same District. Hence, if no appointment is made for any one year at the appropriate time during the year, no appointment can be made for that year at any subsequent time.

20. No vacancy that can be filled ever arises from the neglect to appoint or the non-appointment of a scholar for any District. Vacancies that can be filled can arise only by the appointees having been removed from the University for some cause or other.

21. No appointment can be made from any one county in the State to fill a vacancy in any Assembly District of the State in another county.

# EXAMINATION PAPERS.

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## ENTRANCE EXAMINATIONS.

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### I. ARITHMETIC.

1. Resolve into their prime factors the numbers 216, 360, 432, and 648; and thence find their greatest common divisor and their least common multiple.

2. Reduce to its simplest form the complex fraction :

$$\frac{\frac{5}{9} \text{ of } \frac{12}{7}}{6\frac{1}{5} - 5\frac{4}{15}} \div \frac{\frac{2}{3} \times \frac{11}{12}}{\frac{1}{18} \times 5\frac{1}{2}}.$$

3. Show how to convert pure circulating decimals, and mixed circulating decimals, into common fractions; and explain the reason for your rule.

4. Find the cost of plastering the walls and ceiling of a room 7 metres long, 5 wide, and  $3\frac{1}{2}$  high, at 20 cents per square metre; deducting for a base-board 25 centimetres wide, around the room, and 18 square metres more for doors and windows.

How high is the room, in feet and inches?

5. Find the difference between true and bank discount upon \$2500 payable in 3 months at 7 per cent., making no allowance for grace.

6. Having received a stock dividend of 8 per cent., I now own 297 shares. Find how many shares I had before the dividend was declared.

7. If two men, working 10 hours a day for  $94\frac{1}{2}$  days, dig a trench  $33\frac{3}{4}$  yards long,  $2\frac{5}{8}$  wide, and  $2\frac{2}{3}$  deep; find how many hours a day 35 men must work for 11 days, to dig a trench 90 yards long,  $1\frac{5}{6}$  wide, and  $2\frac{1}{3}$  deep.

8. Extract the square root, to six decimal places, of

.000986399649.

## II. ENGLISH GRAMMAR.

1. Give illustrations of all the parts of speech.
2. Define *pronoun*, *preposition*, *adverb*, *clause*, *phrase*, and *adjunct*.
3. How are the possessive cases of nouns and pronouns formed?
4. Give illustrations of the two infinitives.
5. Define and illustrate verbs of the old or strong conjugation.
6. State the difference in use between *shall* and *will*.
7. Write a sentence illustrating the use of the subjunctive mode.
8. Define and illustrate derivation and composition.
9. Analyze the following sentence and parse in full all the words in it:  
*All that I dread is leaving you behind.*
10. Distinguish between *lie* and *lay*; *my* and *mine*.
11. Of what nature are the subordinate clauses in the following sentences:  
  - a. *The bird that I saw was dead.*
  - b. *She went to where he stood.*
  - c. *They stood silent as he advanced.*
12. Give a synopsis of the preterit of *teach*, including the emphatic form.
13. Name and illustrate the different classes of adverbs.
14. Justify or correct the following sentences:  
  - a. *I had rather stay.*
  - b. *He spoke of Cæsar crossing the Rubicon.*
  - c. *Dot your i s and cross your t s.*
  - d. *He not only owns a house but also a farm.*
  - e. *Neither you or I am going.*
  - f. *Rounding the point the city came into sight.*
15. Write a composition on one of the following subjects:  
*Bicycling, Different ways of Traveling, The Presidential Election.*

## III. GEOGRAPHY.

1. Draw an outline map of Asia, and show thereon (1) the principal rivers and mountain chains; (2) the political divisions and chief cities.
2. Name the gulfs, seas, and bays, that border the coast of Asia.
3. Give some account of the Empire of China and state (1) its area; (2) its population; (3) its form of government; (4) its religion; (5) the chief industries of the people.



4. Name the five principal countries of Europe in the order of (1) their size; (2) their population; (3) their wealth; (4) the intelligence of their people, and their advancement in civilization.

5. Name the capitals of these five countries; give their populations, and their latitudes.

6. Give a general description of Africa; state its size, location, and physical characteristics.

7. State what parts of Africa are civilized, what parts are half civilized, and what parts are barbarous.

8. Draw an outline map of South America, and show its chief rivers, mountains, political divisions, and cities.

9. State what parts of South America have abundant rains, and what parts are dry; and give the reasons therefor.

10. Name the three principal political divisions of North America, and give their locations with reference to each other.

11. What states of the United States (including territories) may be called cotton states? what, grain states? what, mining states?

12. What part of the world's population is Christian? what part is Mohammedan? what part is Buddhist?

#### IV. PHYSIOLOGY.

1. Draw diagrams of the permanent teeth on one side of the upper jaw, and give their names. State the differences in number and character between milk teeth and permanent teeth.

2. Draw an outline diagram of the alimentary canal, and name its parts.

3. Of what is the diaphragm composed? Draw diagrams showing its condition before and after inspiration.

4. What digestive actions are performed by the gastric juice? What ones can it not perform?

5. Draw a diagram of the right side of the heart showing the vessels and valves, and give their names.

#### V. PLANE GEOMETRY.

1. Define: an axiom, a point, an acute angle, a chord of a circle, a regular polygon, symmetry with respect to a centre.

2. If a series of parallels cut any two straight lines and intercept equal distances on one of these lines, they also intercept equal distances on the other line.

3. Upon a given straight line, to describe a segment that shall contain an angle equal to a given angle.

4. Two triangles are similar when they are mutually equiangular.

5. If homologous sides of two similar polygons be 7 feet and 9 feet respectively, find the ratio of the areas.

6. A circle may be circumscribed about any regular polygon; and a circle may be inscribed in the same polygon.

## VI. ALGEBRA, THROUGH QUADRATICS.

I. Define: division, a trinomial, a simple equation, a complex fraction, a power and its exponent, an incommensurable, an imaginary.

2. Resolve into two factors  $x^3 - a^3$ ; and  $32x^5 + 243a^5$ .

3. Find the sum as a single fraction in lowest terms of

$$\frac{4}{(a-b)(a-c)} - \frac{1}{(b-a)(b-c)} - \frac{1}{(c-a)(c-b)}.$$

4. A and B can do a piece of work together in 12 days; A and C, in 15 days; B and C, in 20 days. Find in what time all three together can do it.

5. Determine the value of  $x$  from the three simultaneous equations  $cy + bz = a$ ,  $az + cx = b$ ,  $bx + ay = c$ .

6. Explain why every number has two square roots; and why  $\sqrt{a^4}$  has more values than  $(\sqrt{a})^4$ .

7. Find the two values of  $x$  from the quadratic equation,

$$x^2 - (m + n)x = \frac{1}{4}(p + q + m + n)(p + q - m - n).$$

8. Find all the values of  $y$  from the equation  $y^4 + 3y^2 = 4$ .

9. Find fractions equivalent to the following, but with rational denominators:

$$\frac{7}{2\sqrt{5} - \sqrt{6}}; \quad \frac{2\sqrt{x} - \sqrt{y}}{\sqrt{4x} + \sqrt{y}}; \quad \frac{a + b\sqrt{-1}}{a - b\sqrt{-1}}.$$

## VII. SOLID GEOMETRY AND CONIC SECTIONS.

1. Define: a plane, a parallelopiped, a diedral angle, two symmetrical triedral angles, a segment of a sphere, the axis of a parabola.

2. If a straight line be perpendicular to each of two straight lines at their point of intersection, it is perpendicular to the plane of those lines.

3. Two prisms are equal, if three faces including a triedral angle of one be respectively equal to three faces similarly placed and including a triedral angle of the other.

4. All points of a circle of the sphere are equally distant from either pole of the circle.

5. The volume of a spherical sector is equal to the area of the zone that forms its base multiplied by one-third of the radius of the sphere.

6. To find two straight lines in the ratio of the volumes of two given cubes.

7. In a parabola, the subnormal equals half the parameter.

8. The ordinate of any point of an ellipse is to the ordinate of the corresponding point of the circumscribed circle as the conjugate semi-axis is to the transverse semi-axis.

### VIII. HIGHER ALGEBRA.

1. Prove that in a series of equal ratios, the sum of the antecedents is to the sums of the consequents as any one antecedent is to its consequent.

2. Insert three arithmetical, three geometrical, and three harmonical means between 5 and 13.

3. Expand  $(2x-3y)^{-\frac{1}{4}}$  to four terms by the binomial theorem.

4. Resolve  $\frac{457}{264}$  into a continued fraction, and find all the convergents.

5. Expand  $\frac{2+3x}{1+x+x^2}$  and  $\sqrt{a-x}$  to 3 terms by the method of undetermined coefficients.

6. Find the 50th term of the series 1, 3, 8, 20, 43 by the method of differences.

7. If the coefficient of the first term of an equation be unity, and those of the other terms be integers, the equation cannot have a fractional commensurable root.

8. Find to two decimal places one root of the equation

$$x^3 - 6x^2 + 3x + 5 = 0.$$

### IX. TRIGONOMETRY.

I. For any angle  $\theta$ , show that:

$$\begin{aligned} \sin(\pi + \theta) &= -\sin \theta, & \csc(\pi + \theta) &= -\csc \theta. \\ \cos(\pi + \theta) &= -\cos \theta, & \sec(\pi + \theta) &= -\sec \theta. \\ \tan(\pi + \theta) &= +\tan \theta, & \cot(\pi + \theta) &= +\cot \theta. \end{aligned}$$

2. Find all the angles:

whose sines are  $\pm \sqrt{\frac{1}{2}}$ ,

whose cosines are  $\pm \frac{1}{2} \sqrt{3}$ ,



whose tangents are  $\tan \frac{1}{8}\pi$ ,  
 whose cotangents are  $\tan 20^\circ$ ,  
 whose secants are  $\infty$ ,  
 whose cosecants are  $\pm \sqrt{2}$ .

3. Name the four cases for the solution of right plane triangles, and show in detail how to solve each one of them.

4. In any plane triangle  $\triangle ABC$ , show that

$$\sin \frac{1}{2} A = \sqrt{\frac{(s-b)(s-c)}{bc}},$$

wherein  $a, b, c$  are the lengths of the sides that lie opposite the angles  $A, B, C$ , respectively, and  $s = \frac{1}{2}(a+b+c)$ .

Thence show how to solve a plane triangle when the three sides are given.

5. Find the area of the plane triangle, having given

$$\angle A = 37^\circ 18', \angle B = 92^\circ 18', \text{ and side } c = 39.5 \text{ yards};$$

and find the lengths of the perpendiculars from the three vertices to the opposite sides.

6. In any spherical triangle,  $\triangle ABC$ , show that

$$\cos \frac{1}{2} a = \sqrt{\frac{\cos(s-B) \cos(s-C)}{\sin B \sin C}},$$

wherein  $s$  is the half-sum of the three angles, and  $a$  is the side opposite  $\angle A$ .

7. Using the formula in question 6, solve the oblique spherical triangle, having given  $\angle A = 120^\circ$ ,  $\angle B = 130^\circ$ ,  $\angle C = 80^\circ$ .

## X. FRENCH.

### I.

1. I should like to tell your father that I fear his sick daughter will die before he comes, if he does not hurry.

2. Which knife do you prefer, the small one or your brother's? I do not like either. Mine is better than your brother's and larger than the small one.

3. Lend me your pen, if you please. I cannot lend it to you; I lent it to William.

4. I shall expect you and your wife at my house to-morrow. We will dine at half-past two.

5. Have you seen the lady whose daughter was here yesterday? No, but I met her the other day at my cousin's, she is a very pleasant and ladylike person.

6. Honesty will always have its reward, whatever you may think of it. It is better to be honest than to be rich.

7. How long has your father been dead? He died in the month of February, 1864, at his home in New York.

8. Do you believe that plants grow in the night? Some persons do not believe that they grow as rapidly in the night as in the day.

9. In vain do you ask me to do this for you, my duty forbids me to listen to you.

10. In case you do not receive your book by the post, I will lend you mine in order that you may study your lesson, provided you will return it promptly.

11. I do not doubt it will be raining to-morrow, but I am very warm now.

12. Your nephew is the shortest man I ever saw. How old is he? He will be twenty-five years old next May.

## II.

Translate :

La fonte des neiges avait commencé le 18 ou le 19 mars. Je me rappelle que pendant la grande revue d'Alsace, sur un large plateau d'où l'on découvre le Mein à perte de vue, la pluie ne cessa point de tomber depuis dix heures du matin jusqu'à trois heures de l'après-midi. Nous avions à notre gauche un château, dont les gens regardaient par de hautes fenêtres, bien à leur aise, pendant que l'eau nous coulait dans les souliers. A droite bouillonnait la rivière, que l'on voyait comme à travers un brouillard.

Pour nous rafraîchir les idées, à chaque instant on nous criait : 'Portez arme ! Arme bras !'

Le maréchal s'avavançait lentement, au milieu de son état major. Ce qui consolait Zébédé, c'était que nous allions voir le brave des braves. Moi, je pensais : 'Si je pourais le voir au coin du feu, ça me ferait plus de plaisir.'

Enfin il arriva devant nous, et je le *vois* encore avec son grand chapeau trempé de pluie, son habit bleu couvert de broderies et de décorations et ses grandes bottes. C'était un bel homme, d'un blond roux, le nez relevé, les yeux vifs, et qui paraissait terriblement solide. Il n'était pas fier, car, comme il passait devant la compagnie, et que le capitaine lui présentait les armes, tout à coup il se retourna sur son grand cheval et dit tout haut :

'Tiens, c'est Florentin !'

Alors le capitaine se redressa sans *savoir* que répondre. Il paraît que le maréchal et lui avaient été simples soldats ensemble, du temps de la République. Le capitaine à la fin *répondit*.

‘Oui, maréchal, c’est Sebastien Florentin—Ma foi, Florentin, dit le maréchal en étendant le bras du côté de la Russie, je suis content de te ravoir ; je te *croyais* eouehé là-bas.’

Toute notre compagnie était contente, et Zébédé me *dit* :

‘Voilà ce qui s’appelle un homme ; je me *ferais* easser la tête pour lui !’

Je ne voyais pas pourquoi Zébédé voulait se *faire* easser la tête, parce que maréchal avait dit bonjour à son vieux camarade.

—*Le Conscrit de 1813.*

Give the 1st person sing. and 1st pers. plural of the preterit, future present subj. of the italicised verbs.

### III.

Translate at sight :

C’est La Fontaine qui est notre Homère. Car d’abord il est universel comme Homère : hommes, dieux, animaux, paysages, la nature éternelle et la société du temps, tout est dans son petit livre. Les paysans s’y trouvent, et à côté d’eux les rois, les villageois auprès des grandes dames, chacun dans sa condition avec ses sentiments et son langage, sans qu’aucun des détails de la vie humaine, trivial ou sublime, en soit écarté pour réduire le récit à quelque ton uniforme ou soutenu. Et néanmoins ce récit est idéal comme celui d’Homère.

—*La Fontaine, H. A. TAINÉ.*

## XI. GERMAN.

### I.

Translate :

Der Ritter fuhr in seiner Erzählung fort : “Ich wäre mit meinem scheuen Pferde fast gegen Baumstämme und Aeste angerannt ; es triefte vor Angst und Erhitzung, und wollte sich doch noch immer nicht halten lassen. Zuletzt ging es gerade auf  
5 einen steinigen Abgrund los ; da kam mir’s plötzlich vor, als werfe sich ein langer, weisser Mann dem tollen Hengste quer vor in seinen Weg ; der entsetzte sich davor, und stand ; ich kriegte ihn wieder in meine Gewalt, und sah nun erst, dass  
mein Retter kein weisser Mann war, sondern ein silberheller  
10 Baeh, der sich neben mir von einem Hügel herunterstürzte, meines Rosses Lauf ungestüm kreuzend und hemmend.”

“Danke, lieber Baeh !” rief Undine, in die Händchen klopfend. Der alte Mann aber sah kopfschüttelnd in tiefem Sinnen vor sich nieder.



15 "Ich hatte mich noch kaum im Sattel wieder zurecht  
 gesetzt, und die Zügel wieder ordentlich recht gefasst," fuhr  
 Huldbrand fort, "so stand auch schon ein wunderliches  
 Männlein zu meiner Seite, winzig und hässlich über alle  
 Massen, ganz braungelb, und mit einer Nase, die nicht viel  
 20 kleiner war, als der ganze übrige Bursche selbst. Dabei  
 grinste er mit einer recht dummen Höflichkeit aus dem breit  
 geschlitzten Maule hervor, und machte viele tausend Scharr-  
 füsse und Bücklinge gegen mich. Weil mir nun das Pos-  
 senspiel sehr missbehagte, dankte ich ihm ganz kurz, warf  
 25 meinen noch immer zitternden Gaul herum, und gedachte,  
 mir ein anderes Abenteuer, oder, dafern ich keines fände, den  
 Heimweg zu suchen, denn die Sonne war während meiner  
 tollen Jagd schon über die Mittagshöhe gen Westen gegangen.  
 Da sprang aber der kleine Kerl mit einer blitzschnellen  
 30 Wendung herum, und stand abermals vor meinem Hengste.—  
 "Platz da!" sagt' ich verdrüsslich; "das Thier ist wild und  
 rennet dich leichtlich um."—"Ei," schnarrte das Kerlchen,  
 und lachte noch ensetzlich viel dummer; "schenket mir doch  
 erst ein Trinkgeld, denn ich hab' ja cuer Rösselein aufge-  
 35 fangen; lägt ihr doch ohne mich sammt eurem Rösselein  
 in der Steinkluft da unten; hu!"—"Schneide nur keine  
 Gesichter weiter," sagte ich, "und nimm dein Geld hin,  
 wenn du auch lügst, kenn siehe, der gute Bach dorten hat  
 mich gerettet, nicht aber du, höchst ärmlicher Wicht." Und  
 40 zugleich liess ich ein Goldstück in seine wunderliche Mütze  
 fallen, die er bettelnd vor mir abgezogen hatte. Dann trabte  
 ich weiter."

1. Give the principal parts of *fuhr*—*fort* (1), *angerannt* (2), *werfe* (6), *sah* (8), *missbehagte* (24), *gedachte* (25), *fände* (26), *aufgefangen* (34), *lägt* (35), *Schneide* (36), *gerettet* (39).

2. Give the nominative and genitive singular and the nominative plural, with the appropriate article, of *Erzählung* (1), *Aeste* (2), *Abgrund* (5), *Gewalt* (8), *Bach* (10), *Seite* (18), *Massen* (19), *Abenteuer* (26), *Jagd* (28), *Rösselein* (34), *Trinkgeld* (34).

3. (a) Explain the use of the mood in *wäre* (1), *werfe* (6), *fände* (26), *lägt* (35). (b) Decline throughout *meinem scheuen Pferde* (2). (c) Give the prepositions governing the genitive, dative, and accusative cases. (d) What is the position of the verb in principal and subordinate sentences? (e) What office in the sentence do the following subordinate clauses perform, viz: those

introduced by *als* (5), *der* (7), *dass* (8), *weil* (23). (*f*) Give cognate words in English or in other languages of the German words in the first three lines of the text. (*g*) Parse *fast* (2), *sich* (3), *halten* (4), *Hengste* (6), *der* (7), *sondern* (9), *rief*, (12).

## II.

Translate at sight:

Ein Franzose ritt eines Tages auf eine Brücke zu, die so schmal war, dass zwei Reiter einander kaum darauf ausweichen konnten. Ein Engländer betrat zugleich das entgegengesetzte Ende derselben, und als beide auf der Mitte waren, wollte keiner dem andern Platz machen. "Ein Engländer geht keinem Franzosen aus dem Wege," sagte der Britte. Der Franzmann erwiderte, "Mein Pferd ist auch ein Engländer." Aber der Engländer machte sich wenig aus diesem Einfalle sondern sagte, "Ich kann warten; ich habe hier die schönste Gelegenheit die heutige Zeitung zu lesen, bis es euch gefällt, Platz zu machen."

Also zog er kaltblütig eine Zeitung aus der Tasche, wickelte sie auseinander, und las darin eine Stunde lang, während dass der Franzose eine Pfeife Tabak hervornahm und zu rauchen anfang. Die Sonne neigte sich allmählig gegen die Berge hinab, und sah nicht aus, als ob sie die Thoren noch lange anschauen wollte. Nach einer Stunde aber, als der Engländer fertig war und die Zeitung wieder zusammenlegen wollte, sah er den Franzosen an und sagte, "Nun denn?" Dieser aber, der nicht auf den Kopf gefallen war, erwiderte, "Seid so gut und gebt mir jetzt das Blatt, welches ihr studirt habt, auch ein wenig, auf dass ich ebenfalls darin lesen kann, bis es euch gefällt auszuweichen." Als der Engländer die Geduld seines Gegners sah, sagte er, "Wisst ihr was, ich will euch ausweichen," und er machte ihm alsobald Platz.

## III.

Translate into German:

THE BROKEN HORSESHOE.<sup>1</sup>

A peasant went with his son, little Thomas, to the city. "Look," said he on the way <sup>2</sup> to him, "there lies a piece of a horseshoe on the earth; pick it up <sup>3</sup> and put <sup>4</sup> it in thy pocket." "O," answered Thomas, "it is not worth the trouble,<sup>5</sup> that one should stop <sup>6</sup> for it." The father answered nothing, took the iron and

put it in his pocket. In the next village he sold it to the smith for three cents and bought cherries<sup>7</sup> in return.<sup>8</sup> Thereupon<sup>9</sup> he continued<sup>10</sup> his way. The heat was very great. One saw far and wide neither house nor forest nor spring. Thomas almost perished<sup>11</sup> with thirst,<sup>12</sup> and could only follow his father with difficulty.<sup>5</sup>

Then he let as if by chance<sup>13</sup> a cherry fall. Thomas picked it up eagerly<sup>14</sup> as if it were gold and put it quickly in his mouth. Some steps farther the father dropped a second cherry, which Thomas seized<sup>15</sup> with the same greediness.<sup>16</sup> This lasted<sup>17</sup> until he had picked them all up. When he had eaten the last, the father turned<sup>18</sup> to him and said, "Behold, if thou hadst been willing to stop a single time to pick up the horseshoe, thou wouldst not have needed<sup>19</sup> to stop a hundred times for the cherries."

1 Hufeisen.	7 Kirsche.	14 gierig.
2 unterwegs.	8 dafür.	15 ergreifen.
3 aufheben.	9 Hierauf.	16 Gierigkeit.
4 stecken.	10 fortsetzen.	17 fort dauern.
5 Mühe.	11 vergehen.	18 sich wenden.
6 sich bücken.	12 Durst.	19 nötig haben.
	13 durch Zufall.	

## XII. LATIN.

[ For the Courses in Arts, Literature, Philosophy, and History and Political Science.]

### *Translation at Sight and Grammar.*

#### A. HIRTIUS, GALLIC WAR, II.

Translate :

Caesar, eum animadverteret hostem complures dies castris palude et loci natura munitis se tenere neque oppugnari castra eorum sine dimicatione perniciose nec locum munitionibus claudi nisi a maiore exercitu posse, litteras ad Trebonium mittit, ut quam celerrime posset legionem XIII, quae cum T. Sextio legato in Biturigibus hiemabat, arcesseret atque ita eum tribus legionibus magnis itineribus ad se veniret; ipse equites in vicem Remorum ac Lingonum reliquarumque civitatum, quorum magnum numerum evocaverat, praesidio pabulationibus mittit, qui subitas hostium incursiones sustinerent.

Decline *se*, *tribus legionibus*, and *magnis itineribus* (in both numbers).



Compare *celerrime, maiore*.

Give the principal parts (in both voices) of *animadverteret, tenere, claudi, sustinerent*. Inflect *mittit* in the present subjunctive passive, and *veniret* in the pluperfect subjunctive active. Give the first person singular active of the future indicative and the present subjunctive of *munitis, claudi, posse, hiemabat, sustinerent*.

Give the reason for the mood and for the tense of *posse, hiemabat, sustinerent*.

Give the reason for the case of *dies, eorum, itineribus, quorum, praesidio*.

Explain the composition of *civitatum, praesidio, incursiones*, giving prefix (if any), root, and suffix or suffixes employed to form the stem from the root, with the meaning of each of these parts.

#### VIRGIL.

Translate :

Adgrederere O magnos—aderit iam tempus—honores,  
eara deum suboles, magnum Iovis incrementum !

Aspice convexo nutantem pondere mundum,  
terrasque tractusque maris caelumque profundum !

Aspice, venturo laetentur ut omnia saeclo !

O mihi tam longae maneat pars ultima vitae,  
spiritus et quantum sat erit tua dicere faeta !

—*Ecl.* IV, 48–54.

What is the subject of the eelogue ?

Account for the mood and tense of *laetentur*.

Translate :

Quam simul ac tali persensit peste teneri  
cara Iovis coniunx, nec famam obstare furori,  
talibus adgreditur Venerem Saturnia dictis :

‘Egregiam vero laudem et spolia ampla refertis  
tuque puerque tuus, magnum et memorabile nomen,  
una dolo divom si femina vieta duorum est !

Nec me adeo fallit veritam te moenia nostra  
suspectas habuisse domos Karthaginis altae.

Sed quis erit modus, aut quo nunc certamine tanto ?

Quin potius pacem aeternam pactosque hymenaeos  
exereemus ?

—*Aen.* IV, 90–100.

Write out the first two verses, dividing into feet and marking the caesuras, and give the rules for the length of all penultimate and final syllables.

## CICERO.

[Take 1, if you have read the oration, otherwise 2.]

## 1. Translate :

Nam, quas res nos in consulatu nostro vobiscum simul pro salute huius urbis atque imperii et pro vita civium proque universa republica gessimus, attigit hic versibus atque incohavit; quibus auditis, quod mihi magna res et iucunda visa est, hunc ad perficiendum adiuvi. Nullam enim virtus aliam mercedem laborum periculorumque desiderat praeter hanc laudis et gloriae; qua quidem detracta, iudices, quid est, quod in hoc tam exiguo vitae curriculo et tam brevi tantis nos in laboribus exerceamus?

—*Arch.* XI, 28.

Explain more fully what Cicero says of his connection with Archias. What is the purpose of the oration?

## 2. Translate :

Quem quidem ego cum ex urbe pellebam, hoc providebam animo, Quirites, remoto Catilina non mihi esse P. Lentuli somnum, nec L. Cassii adipem, nec C. Cethegi furiosam temeritatem pertimescendam. Ille erat unus timendus ex his omnibus, sed tam diu, dum moenibus urbis continebatur. Omnia norat, omnium aditus tenebat; appellare, tentare, sollicitare poterat, audebat; erat ei consilium ad facinus aptum; consilio autem neque lingua neque manus deerat; iam ad certas res conficiendas certos homines delectos ac descriptos habebat; neque vero, cum aliquid mandaverat, confectum putabat. Nihil erat, quod non ipse obiret occurreret, vigilaret laboraret; frigus sitim famem ferre poterat.

—*Cat.* III, 7.

Account for the case of *mihi, ei*. What other construction could replace *ex his omnibus*? Account for the mood of *laboraret*.

## COMPOSITION.

Translate into Latin :

Cicero hoped that Catiline would go out from the city of his own accord, and in this way show that he was an enemy to the state. He therefore, after intercepting certain letters, accused Catiline in the presence of the senate of having plotted<sup>1</sup> against the lives of the citizens. Catiline left the senate-house, not because he was ashamed of his purposes, but because those who were present, as if with one voice, called him "traitor" and "paricide."

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<sup>1</sup> insidiari.

## XIII. GREEK.

## I.

## ATTIC PROSE.

Ἐντεῦθεν ὑπολαβὼν Ἀγασίας Στυμφάλιος εἶπεν. Ἀλλὰ τούτῳ γε οὔτε τῆς Βοιωτίας προσήκει οὐδὲν οὔτε τῆς Ἑλλάδος παντάπασιν· ἐπεὶ ἐγὼ αὐτὸν εἶδον ὥς-περ Λυδὸν ἀμφοτέρω τὰ ὦτα τετυπημένον. Καὶ εἶχεν οὕτως. Τοῦτον μὲν οὖν ἀπήλασαν· οἱ δ' ἄλλοι παρὰ τὰς τάξεις ἰόντες ὅπου μὲν στρατηγὸς σῶος εἴη τὸν στρατηγὸν παρεκάλουν· ὁπόθεν δὲ οἴχοιτο τὸν ὑποστρατηγόν· ὅπου δ' αὖ λοχαγὸς σῶος εἴη τὸν λοχαγόν. Ἐπεὶ δὲ πάντες συνῆλθον, εἰς τὸ πρόσθεν τῶν ὀπλῶν ἐκαθέζοντο· καὶ ἐγένοντο οἱ συνελθόντες στρατηγοὶ καὶ λοχαγοὶ ἀμφὶ τοὺς ἑκατόν. Ὅτε δὲ ταῦτα ἦν, βχεδὸν μέσαι ἦσαν νύκτες. Ἐνταῦθα Ἰερώνυμος Ἥλειος πρεσβύτατος ὢν τῶν Προξένου λοχαγῶν ἤρχετο λέγειν ὧδε· Ἡμῖν, ὧ ἄνδρες στρατηγοὶ καὶ λοχαγοὶ, ὁρῶσθι τὰ παρόντα ἔδοξε καὶ αὐτοῖς συνελθεῖν καὶ ὑμᾶς παρακαλέσαι, ὅπως βουλευσάμεθα εἴ τι δυναίμεθα ἀγαθόν. Λέξον δ', ἔφη, καὶ σύ, ὧ Ξενοφῶν, ἅπερ καὶ πρὸς ἡμᾶς.

—XENOPHON, *Anabasis*, III, I, 31.

Define *enclitic* and *proclitic*, giving examples from the above passage. Give the nom. and gen. sing. of ὦτα and τάξεις, with the rule for the accentuation of those forms. Decline ἐγὼ through all numbers. Compare μέσαι.

Give the principal parts of εἶδον, ἀπήλασαν, συνῆλθον, ἔδοξε, δυναίμεθα. How is the present of ἐγένοντο formed from the verb stem? Give the general rule for the accentuation of verbs, and point out some exceptions to it that occur in the above passage.

Give the reason for the opt. in οἴχοιτο, βουλευσάμεθα, δυναίμεθα. Recount briefly the events immediately preceding those described in this passage of the *Anabasis*.

Translate (at sight):

Ἀγηςίλαος τοίνυν ἔτι μὲν νέος ὢν ἔτυχε τῆς βασιλείας· ἄρτι δὲ ὄντος αὐτοῦ ἐν τῇ ἀρχῇ, ἐξηγγέλθη βασιλεὺς ὁ Περσῶν ἀδροῖζων καὶ ναυτικὸν καὶ πεζὸν



πολὺ στρατεύμα ὥς ἐπὶ τοὺς Ἑλληνας· βουλευομένων  
 δὲ περὶ τούτων Λακεδαιμονίων καὶ τῶν συμμάχων,  
 Ἀγησίλαος ὑπέσθη, ἂν δῶδιν αὐτῷ τριάκοντα μὲν  
 Σπαρτιατῶν, δισχιλίους δὲ νεοδαμώδεις (freedmen), εἰς  
 ἑξακισχιλίους δὲ τὸ σύνταγμα τῶν συμμάχων, διαβή-  
 σεσθαι εἰς τὴν Ἀσίαν καὶ πειράσεσθαι εἰρήνην ποιῆσαι,  
 ἢ ἂν πολεμεῖν βούληται ὁ βάρβαρος, ἀσχολίαν (too  
 much to do) αὐτῷ παρέξειν στρατεύειν ἐπὶ τοὺς Ἑλλη-  
 νας.

—XENOPHON, *Agesilaus*, I, 6.

## II.

### COMPOSITION.

If King Agesilaus had not crossed over into Asia at that time, the Persians would have made an expedition against the Greeks with a great force of ships and men.

## III.

### HOMER.

Translate :

400 ἄλλος δ' ἄλλῳ ἔρεξε θεῶν αἰειγενετάων,  
 εὐχόμενος θάνατόν τε φυγεῖν καὶ μῶλον Ἄρηος.  
 αὐτὰρ ὁ βοῦν ἱέρευσεν ἄναξ ἀνδρῶν Ἀγαμέμνων  
 πίονα, πενταέτηρον, ὑπερμενείῃ Κρονίῳ.  
 κίκλησεν δὲ γέροντας ἀριστῆας Παναχαιῶν,  
 405 Νέστορα μὲν πρῶτιστα καὶ Ἰδομενῆα ἄνακτα,  
 αὐτὰρ ἔπειτ' Αἴαντε δύω καὶ Τυδέος υἱόν,  
 ἔκτον δ' αὖτ' Ὀδυσῆα, Διὶ μῆτιν ἀτάλαντον.  
 αὐτόματος δέ οἱ ἦλθε βοὴν ἀγαθὸς Μενέλαος·  
 ἦδε γὰρ κατὰ θυμὸν ἀδελφεὸν ὥς ἐπονείτο.  
 410 βοῦν δὲ περιστήσαντο, καὶ οὐλοχύτας ἀνέλοντο·  
 τοῖσιν δ' εὐχόμενος μετέφη κρείων Ἀγαμέμνων.

Ζεῦ κύδιστε, μέγιστε, κελαινεφές, αἰθέρι ναίων,  
 μὴ πρὶν ἐπ' ἥελιον δύναι, καὶ ἐπὶ κνέφας ἔλθεῖν,  
 πρὶν με κατὰ πρηνὲς βαλέειν Πριάμοιο μέλαθρον  
 415 αἰθαλόεν, πρῆσαι δὲ πυρὸς δηϊοιο θύρετρα,  
 Ἐκτόρεον δὲ χιτῶνα περὶ στήθεσσι δαΐξαι  
 χαλκῷ ῥωγαλέον· πολέες δ' ἄμφ' αὐτὸν ἑταῖροι  
 πρηνέες ἐν κονίῃσιν ὁδᾶξ λαζοίατο γαῖαν.

—*Iliad*, Book II.

Where formed (tense, mood, voice), and from what verbs, are ἤδεε, περιστῆσαντο, ἀνέλοντο, λαζοίατο? Give the Attic form of the above.—Explain the use of the inf. inl. 413, and the opt. in l. 418.—Scan ll. 400, 404, 410, and explain the quantity of the final syllable of ἄλλω (in l. 400), γέροντας, οὐλοχύτας.

## SCHOLARSHIP EXAMINATIONS.

### I. ARITHMETIC.

1. Find the greatest common divisor, and the least common multiple, of  $\frac{7}{9}$ ,  $1\frac{10}{11}$ ,  $3.\dot{6}\dot{0}$

2. Define *proportion*; and give the rules, with the reasons for them, whereby problems in simple and compound proportion are solved.

3. How is the *metre* defined, and how is it related to the decimetre, the litre, and the kilogramme?

How many grammes of a liquid  $1\frac{1}{2}$  times as heavy as water would fill a cube whose edge is 20 centimetres? How many litres? How many million of such cubes would reach around the world?

4. At \$37.50 per acre, find the cost of a rectangular field  $55.33^{\text{ch}}$  long and  $148^{\text{rd}} 3^{\text{yd}} 1^{\text{ft}} 6^{\text{in}}$  wide.

5. Find how much gold 15, 17, and 22 carats fine must be mixed with 5 ounces 18 carats fine, so as to make 12 ounces 20 carats fine.

6. Of a debt, one-third is to be paid in 2 months, one-fourth in 6 months, one-sixth in 10 months, and the balance in one year. Find at what time, in equity, the whole should be paid if all the payments were converted into one.

7. A speculator had 5000 barrels of flour that cost him \$8 a barrel; he sold 30 p.c. of the lot at an advance of 10 p.c. on the cost, and 50 p.c. of the remainder at a further advance of  $2\frac{1}{2}$  p.c. on the cost; and he closed out the lot at \$8.50 a barrel. Find how much he made, and what percentage of the cost.

8. Define *interest*, and state the difference between simple and compound interest.

Define *discount*, and state the difference between true and bank discount.

9. Find what principal will amount to \$1000 in  $3\frac{1}{2}$  years at  $3\frac{1}{2}$  p. c., compound interest.

10. Upon a note for \$1000, dated January 1, 1878, due in one year, and bearing interest at the rate of 6 p. e. from the date of maturity, the following payments were made:

August 16, 1879,.....	\$300
February 12, 1880,.....	200
October 3, 1881,.....	50
January 27, 1882,.....	19
May 31, 1883,.....	22

What was due January 1, 1884, by the United States rule for the computation of partial payments?

11. Define *cube root*, and give the rules, with the reasons for them, for finding the cube roots both of whole numbers and of fractions.

12. Find the fifth root of 14348907.

## II. GEOMETRY.

1. The sum of the squares of the four sides of a quadrilateral is equal to the sum of the squares of the two diagonals and four times the square of the line that joins the middle points of the diagonals.

2. If a plane figure be symmetric about two axes at right angles to each other, it is also symmetric about the point of intersection of these axes, as a centre.

3. Two rectangles having the same altitude are to each other as their bases.

Prove the proposition both when the bases are commensurable and when they are incommensurable.

4. Draw a pentagon, and construct a triangle equal to it in area. Construct carefully and explain fully.

5. Draw a circle, and inscribe in it a regular dodecagon, a regular hexagon, and a regular pentadecagon.

Construct carefully and explain fully.

6. A circle being given, two similar polygons may always be found, the one circumscribed about it and the other inscribed in it, whose areas shall differ by less than that of any assigned surface.

7. Of all triangles having the same altitude and the same vertical angle, the isosceles triangle has the least area.

8. If a quadrilateral be inscribed in a circle, the product of its diagonals is equal to the sum of the products of its two pairs of opposite sides.



9. The area of a trapezoid is double the area of a triangle whose base is one of the non-parallel sides of the trapezoid, and whose vertex is the middle point of the opposite side.

10. If  $AB$  be a fixed diameter of a circle, and if at  $C$ , a moving point on the circumference, a tangent be drawn, and if a perpendicular from  $B$  upon this tangent meet the chord  $AC$  produced, in  $D$ ; find the locus of  $D$ .

11. If from either vertex of a parallelogram straight lines be drawn to the middle points of the two non-adjacent sides, these lines trisect a diagonal of the parallelogram.

12. Draw two similar polygons, and construct a third polygon that shall be similar to these two and equivalent to their sum.

Construct carefully and explain fully.

### III. ALGEBRA.

1. Explain the nature of negative quantities, and the reason for the rule of signs in subtraction, and in multiplication.

2. Find the highest common divisor of

$$10a^2bx^3 + 5a^2bx^2 + 5a^2b,$$

$$15ab^2x^3 + 5ab^2x^2 + 5ab^2x + 15ab^2, \quad \text{and}$$

$$x^3 + (a+b+1)x^2 + (ab+a+b)x + ab.$$

Write the lowest common multiple of these three polynomials as a product of its prime factors; not actually performing the multiplication.

3. Demonstrate the rules by which problem 2 is solved.

4. Explain the fallacy in the following argument:—

$$\text{“If } x = 1, \text{ then } x^2 - 1 = x^3 - 1 ;$$

$$\therefore, \text{ dividing by } x - 1, \quad x + 1 = x^2 + x + 1,$$

$$\therefore 2 = 3.”$$

5. Solve the simultaneous equations

$$2xy + 3xz + 4yz = 11,$$

$$3xy + 4xz + 2yz = -6,$$

$$4xy + 2xz + 3yz = 4.$$

6. If the circumference of a bicycle-wheel were 1 foot less, it would make 15 more revolutions in running a certain distance; but if the circumference were 1 foot more, it would make 13 less revolutions in that distance. Find the actual circumference, and the distance run.

7. Solve the quadratic equation

$$ax^2 + bx + c = 0.$$

Show what the two values of  $x$  become when  $c = 0$ ; also, when  $a = 0$ ; also, when  $a$  is very small.

8. Show whether the following argument be sound:

$$“(\sqrt{-3})^2 = \sqrt{-3 \times -3} = \sqrt{9} = 3.”$$

9. Reduce to its simplest form the expression

$$(2x)^{\frac{2}{3}}y^{-\frac{1}{3}} \div \sqrt[3]{(6x^{-1} \cdot \sqrt{y})}.$$

10. Extract the cube root of the polynomial

$$x^6 + 6x^4 + 9x^2 - 4 - 9x^{-2} + 6x^{-4} - x^{-6}.$$

11. Solve  $x^4 - 4x^3 - 4x^2 + 16x - 8 = 0$  as a quadratic equation, giving all the roots in their simplest form.

12. Find two numbers whose sum is 2, and the sum of whose 5th powers is 242. Give all the solutions.

#### IV. LATIN.

[For the Classical Scholarships, and the Scholarships in Latin and Mathematics.]

##### *Translation at Sight and Grammar.*

Translate:

Nēque ullum fere totius hiemis tempus sine sollicitudine Caesaris intercessit, quin aliquem de consiliis ac motu Gallorum nuntium acciperet. In his ab Lucio Roscio, quem legioni decimae tertiae praefecerat, certior est factus, magnas Gallorum copias earum civitatum, quae Armoricae appellantur, oppugnandi sui causa convenisse, neque longius milia passuum octo ab hibernis suis afuisse, sed nuntio allato de victoria Caesaris discessisse, adeo ut fugae similis discessus videretur.

At Caesar principibus cuiusque civitatis ad se evocatis, alias territando, cum se scire, quac fierent, denuntiaret, alias cohortando, magnam partem Galliae in officio tenuit. Tamen Senones, quae est civitas in primis firma et magnae inter Gallos auctoritatis, Cavarinum, quem Caesar apud eos regem constituerat, cuius frater Moritasgus adventu in Galliam Caesaris cuiusque maiores regnum obtinuerant, interficere publico consilio conati, cum ille praesensisset ac profugisset, usque ad fines insecuti, regno domoque expulerunt; et missis ad Caesarem satisfaciendi causa legatis, cum is omnem ad se senatum venire iussisset, dicto audientes non fuerunt.

—CAESAR, B. G., v. 53–4.

Give the reason for the case of *quem* (after *Roscio*), *legioni*, *milia*, *territando*, *auctoritatis*, *regem*, and for the mood of *convenisse*, stating for each the Roman usage which it exemplifies.

What did Caesar mean by the imperfect tense in *denuntiaret*, the present in *est*, the pluperfect in *obtinuerant*?

Decline the phrases *hibernis suis*, *milia passuum octo*, and *fugae similis discessus*.

Compare *similis* and its corresponding adverb, *longius*, *firma*.

Give the principal parts, active and passive (where both exist), of *afuisse*, *fierent*, *iussisset*, *audientes*. Write the first and third persons singular active and passive (where both exist) of each of these verbs in the imperfect, future and future perfect indicative, the present subjunctive, the present participle and the future infinitive.

Analyze *legioni*, *victoria*, *regnum*, giving the meaning of each component part in each word.

By what case is the subject of an active verb expressed? by what the object? By what case is the subject of an active verbal noun expressed? by what the object? Give an example of each.

What is the essential difference in meaning between the indicative and the subjunctive moods?

Translate:

Summam video esse in te, Ser. Sulpici, dignitatem generis, integritatis, industriae ceterorumque ornamentorum omnium, quibus fretum ad consulatus petitionem adgredi par est. Paria cognosco esse ista in L. Murena atque ita paria, ut neque ipse dignitate a te vinci potuerit neque te dignitate superarit. Contempsisti L. Murenæ genus, extulisti tuum. Quo loco si tibi hoc sumis, nisi qui patricius sit, neminem bono esse genere natum, facis ut rursus plebes in Aventinum sevocanda esse videatur.

—CICERO, *Mur.*, 7.

Explain the allusion in the last clause.

#### VIRGIL.

Translate:

*D.* Vis ergo inter nos quid possit uterque vicissim experiamur? Ego hanc vitulam—ne forte recuses, bis venit ad mulctram, binos alit ubere fetus—depono: tu dic, mecum quo pignore certes.

*M.* De grege non ausim quicquam deponere tecum. Est mihi namque domi pater, est iniusta noverca; bisque die numerant ambo pecus, alter et haedos.



Verum, id quod multo tute ipse fatebere maius,  
 insanire libet quoniam tibi, pocula ponam  
 fagina, caelatum divini opus Alcimedontis;  
 lenta quibus torno facili superaddita vitis  
 diffusos hedera vestit pallente corymbos.

—*Ecl.* III, 28–39.

Where did bucolic poetry originate?

Translate :

Puppique deus consedit in alta,  
 Phorbanti similis, funditque has ore loquelas:  
 ‘Iaside Palinure, ferunt ipsa aequora classem;  
 aequatae spirant auræ; datur hora quieti.  
 Pone caput, fessosque oculos furare labori:  
 ipse ego paulisper pro te tua munera inibo.’  
 Cui vix attollens Palinurus lumina fatur:  
 ‘Mene salis placidi voltum fluctusque quietos  
 ignorare iubes? Mene huic confidere monstro?  
 Aenean credam quid enim fallacibus auris  
 et caelo, totiens deceptus fraude sereni?’

Talia dicta dabat, clavumque affixus et haerens  
 nusquam amittebat, oculosque sub astra tenebat.

—*Aen.* v. 841–851.

What is the subject of the fifth book?

What is the probable origin of the above story of Palinurus?

Write out the last two verses, indicating feet, quantities, and  
 cæsuras, and give the rules for all the quantities.

#### CICERO.

Translate :

Municipiis dispertiri iubet. Habere videtur ista res iniquitatem, si imperare velis, difficultatem, si rogare. Decernatur tamen, si placet. 8. Ego enim suscipiam et, ut spero, reperiam, qui id, quod salutis omnium causa statueritis, non putet esse suae dignitatis recusare. Adiungit gravem poenam municipiis, si quis eorum vincula ruperit; horribiles custodias circumdat et digna scelere hominum perditorum sancit, ne quis eorum poenam, quos condemnat, aut per senatum aut per populum levare possit.

—*Cat.* IV, 4, 7–8.

Whose opinion is here stated? What was the opposing opinion, and by whom was it proposed?

## COMPOSITION.

Translate into Latin the passage following the brackets :

[The Pompeians regarded this as completely deciding the contest. The noble Romans threw off their reserve; some advised Pompey to reënter Italy, others to reconquer Spain. The vast retinue of consulars, senators and generals were a great hindrance to any energetic and active operations.] Some accused Pompey of not wishing to conquer, and Domitius asked how long Agamemnon, the king of kings, intended the war to last. The most insolent was Labienus, Caesar's old lieutenant, the only one who had deserted him. He swore that he would conquer his old general. The prisoners taken at Dyrrachium he ordered to be put to death. "We will have no peace," said he, "until you bring us Caesar's head." The noble senators were so sure of victory that they began to dispute about the consulates and praetorships.

—*Leighton's History of Rome*, pp. 330–331.

## V. · GREEK.

Translate :

Ἐκτωρ δὲ Πριάμοιο πάϊς καὶ δῖος Ὀδυσσεὺς  
 χῶρον μὲν πρῶτον διεμέτρεον, αὐτὰρ ἔπειτα  
 κλήρους ἐν κυνέῃ χαλκήρεϊ πᾶλλον ἐλόντες,  
 ὁππότερος δὴ πρόσθεν ἀφείη χάλκεον ἔγχος.  
 λαοὶ δ' ἠρήσαντο, θεοῖσι δὲ χεῖρας ἀνέσχον.  
 ὧδε δὲ τις εἵπεσκεν Ἀχαιῶν τε Τρώων τε.

Ζεῦ πάτερ, Ἰδῆθεν μεδέων, κύδιστε, μέγιστε!  
 ὁππότερος τάδε ἔργα μετ' ἀμφοτέροισιν ἔθηκεν,  
 τὸν δὲς ἀποφθίμενον δύναι δόμον Ἀἴδος εἶδω,  
 ἡμῖν δ' αὖ φιλότητα καὶ ὄρκια πιστὰ γενέσθαι.

Ὡς ἄρ' ἔφαν· πᾶλλεν δὲ μέγας κορυθαίολος Ἐκτωρ  
 ἄψ ὁρόων· Πάριος δὲ θοῶς ἐκ κλῆρος ὄρουσεν.  
 οἱ μὲν ἔπειθ' ἵζοντο κατὰ στίχας, ἦχι ἐκάστω  
 ἵπποι ἀερσίποδες καὶ ποικίλα τεύχε' ἔκειτο.  
 αὐτὰρ ὅγ' ἀμφ' ὧμοισιν ἐδύβατο τεύχεα καλὰ  
 δῖος Ἀλέξανδρος, Ἑλένης πόβις ἡυκόμοιο.

—*Iliad*, III, 314–329.

State where *αφείη* is formed, and from what verb, and explain the mood as used here.—Give the Attic form of *ἠρήσαντο*, and the rule for it.—Explain the meaning of the form *εἵπεσκεν*.

Translate :

Μένων δὲ ὁ Θετταλὸς δῆλος ἦν ἐπιθυμῶν μὲν πλουτεῖν ἰσχυρῶς, ἐπιθυμῶν δὲ ἄρχειν, ὅπως πλείω λαμβάνοι· ἐπιθυμῶν δὲ τιμᾶσθαι, ἵνα πλείω κερδαίνοι· φίλος τ' ἐβούλετο εἶναι τοῖς μέγιστα δυναμένοις, ἵνα ἀδικῶν μὴ διδοίη δίκην. ἐπὶ δὲ τὸ κατεργάζεσθαι ὧν ἐπιθυμοίη συντομωτάτην ᾧετο ὁδὸν εἶναι διὰ τοῦ ἐπιορκεῖν τε καὶ ψεύδεσθαι καὶ ἐξαπατᾶν· τὸ δὲ ἀπλοῦν καὶ τὸ ἀληθὲς ἐνόμιζε τὸ αὐτὸ τῷ ἡλιθίῳ εἶναι στέργων δὲ φανερός μὲν ἦν οὐδένα, ὅτῳ δὲ φαίη φίλος εἶναι, τούτῳ ἔνδηλος ἐγίγνετο ἐπιβουλεύων. καὶ πολέμιου μὲν οὐδενὸς κατεγέλα, τῶν δὲ συνόντων πάντων ὡς καταγελῶν ἀεὶ διελέγετο.

—*Anabasis*, II, IV, 21-23.

*Λαμβανοί*, why the optative? Show how this tense is formed from the verb-stem. Show the same of *διδοίη*. Give the derivation of *συντομωτάτην*. Rule for the case of *τῷ ἡλιθίῳ*? Where is *κατεγέλα* formed, and from what verb? Inflect this form.

Translate (at sight):

Καὶ γὰρ ἐν ταῖς μάχαις πολλάκις δῆλον γίγνεται ὅτι τό γε ἀποθανεῖν ἄν τις ἐκφύγοι καὶ ὅπλα ἀφείς, καὶ ἐφ' ἱκετεῖαν τραπόμενος τῶν διωκόντων· καὶ ἄλλαι μηχαναὶ πολλαὶ εἰσὶν ἐν ἐκάστοις τοῖς κινδύνοις ὥστε διαφεύγειν θάνατον, ἐάν τις τολμᾷ πᾶν ποιεῖν καὶ λέγειν.

Translate into Greek:

I love not those who are plainly willing to lie and deceive in order to have riches, nor should I wish to become the friend of one who dared to do or say anything and everything for the sake of escaping death.



# SIXTEENTH ANNUAL COMMENCE- MENT.

JUNE 19, 1884.

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### *Theses Presented to the Public.*

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GEORGE FORD DITMARS, *Ovid Centre*
2. *Thesis in Chemistry*—Arsenic in Commercial Products,  
CLARENCE ISAAC ROBINSON, *Mt. Vision*
3. *Dissertation*—The Women of the American Anti-  
Slavery Conflict, HELEN MAR OAKES, *Steuben*
4. *Disquisition*—The Mythological View of Nature Re-  
vived in Wordsworth, DELBERT HARVEY DECKER, *Fulton*
5. *Thesis in Architecture*—The Growth of Japanese  
Architecture, YORINAKA TSUMAKI, *Tokio, Japan*
6. *Oration*—John Quincy Adams in the House of Repre-  
sentatives, OSCAR DILLWYN WEED, *North Rose*
7. *Oration*—Edmund Burke and the American Revolu-  
tion, ERNEST WILSON HUFFCUT, *Afton*
8. *Thesis in Civil Engineering*—The Economics of the  
American Trans-Isthmian Projects,  
DANIEL WEBSTER MEAD, *Rockford, Ill.*
9. *The Woodford Prize Oration*—The Growth of National  
Consciousness in the American People,  
CHARLES ANSON POTTER, *Ithaca*

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IDA CORNELL, *Central Valley*
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HARRIET ELIZABETH GROTECLOSS, *New York City*
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ERNEST EMORY RUSSELL, *Havana*
17. Profile of High Masonry Dams,  
IRA ALEXANDER SHALER, *New York City*
18. The Sturm und Drang Movement in Germany,  
HARRY LAURENCE SHIVELY, *Indianapolis, Ind.*
19. Municipal Suffrage, CHARLES MONROE THORP, *Oil City, Pa.*
20. Wendell Phillips and the Abolition Movement,  
BYRON DEAN VAN OSTRAND, *Marion*
21. Experiments with an Electric Motor, JOHN WARING, *Ovid*
22. The Preservation of our Forests,  
NELSON ACKLEY WELLES, *Elmira*

## II. THESES OF CANDIDATES FOR SECOND DEGREES.

1. *In Geology*—The Serpentine Areas of Staten Island, Hoboken, N. J., and Westchester County,  
HENRY PLATT CUSHING, B.S.
2. *In Civil Engineering*—Design, Specifications and Analysis of a Howe Truss-Bridge, CLARK WALDO MCCREA, B.C.E.
3. *In Ancient Classical Literature*—Thucydides' Influence on Demosthenes, MARY MERRILL PITCHER, A.B.
4. *In Ancient Classical Literature*—The Political Opinions of Isocrates, JOHN CAREW ROLFE, A.B., (Harvard).

## III. PRIZES AWARDED.

## THE WOODFORD PRIZE IN ORATORY.

TO CHARLES ANSON POTTER.

## THE HORACE K. WHITE PRIZES IN VETERINARY SCIENCE.

The first to . . . . . FRED. MARTIN CHAPPELL

The second to . . . . . WILLIAM AUGUSTUS LOCKWOOD.

## IV. HONORS.

## HONORS FOR GENERAL EXCELLENCE.

MISS EMMA NEAL BASSETT,	ERNEST EMORY RUSSELL,
MISS IDA CORNELL,	IRA ALEXANDER SHALER,
MISS HARRIET ELIZABETH GROTE-	HARRY LAURENCE SHIVELY,
CLOSS,	CHARLES MONROE THORP,
ERNEST WILSON HUFFCUT,	YORINAKA TSUMAKI,
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EVERETT FLEET MORSE,	WALTER LORING WEBB,
MISS HELEN MAR OAKES,	OSCAR DILLWYN WEED,
HENRY JAY PATTEN,	CHARLES BUNDY WILSON.

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WILLIAM CHRISTOPHER KRAUSS, *Insect Anatomy*.HARRY LAURENCE SHIVELY, *German*.ANDREW CURTIS WHITE, A.B., (Hamilton) *Latin and Greek*.

## SPECIAL MID-COURSE HONORS.

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## V. DEGREES CONFERRED.

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AMENDED JUNE, 1873.

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III. All graduates of this University who, by their diplomas, are entitled electors of the University, are members of this association. All members of the Faculty of this University are honorary members of this association.

IV. The officers of this association shall consist of a president, and one vice-president from each graduating class, a corresponding secretary, a recording secretary and treasurer.

V. This association shall meet annually on the day preceding Commencement, at ten o'clock in the forenoon.

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# INDEX.

Admission, 41.  
     to advanced standing, 46.  
     to courses, 43.  
     from other colleges, 45.  
     to graduate study, 46.  
     without examination, 45.  
 Advanced degrees, 50.  
 Agriculture, 73.  
     course in, 58.  
 Alumni, 158.  
 Anatomy, 107.  
 Anglo-Saxon, 111.  
 Architecture, 78.  
     course in, 60.  
 Arts, course in, 53.  
 Astronomy, 99.  
 Baccalaureate degrees, 49.  
 Botany, 103.  
 Calendar, 5.  
 Candidates, for admission, 41.  
     for state scholarships, 127.  
 Catalogue of students, 21.  
 Chapel, 10.  
 Charter, 7.  
 Chemistry, 81.  
     agricultural, 75.  
     analytical, 81.  
         course in, 61.  
 Chemistry and Physics, 80.  
     course in, 61.  
     honors in, 122.  
 Christian Association, 11.  
 Civil engineering, 85.  
     courses in, 62.  
 Class day, 6.  
 Classification of Students, 46.  
 Commencement, 6.  
     programme of sixteenth, 153  
 Courses of study, general, 53.  
     special and technical, 58.  
 Degrees, 49.  
     conferred, 155.  
 Drawing, Free-hand, 79.  
 Engineering, civil, 85.  
     electrical, 87.  
     marine, 88.  
     mechanical. See Mechanic Arts.  
     mining, 89.

English, for admission, 41.  
     literature, 111.  
 Entomology, 75.  
     honors in, 123.  
 Examination papers, for entrance, 130.  
     for Scholarships, 145.  
 Examinations, at end of term, 47.  
     for admission, 41.  
     advanced degrees, 50.  
     honors, 118.  
     state scholarships, 127.  
     times of holding, 41, 45.  
 Expenses, 48.  
 Faculty, general, 8, 13.  
 Faculties, special, 8, 18.  
 Farm, 74.  
 Fees, 48, 50, 52.  
 Fellowships, 126.  
 Foundation of the University, 7.  
 Founder's day, 5.  
 Free tuition, 48.  
 French, 98.  
     for admission, 43.  
     honors in, 120, 121.  
 Geography for admission, 41.  
 Geology, 105.  
 German, 96.  
     for admission, 44.  
     honors in, 120, 121.  
 Graduate courses, 50.  
 Graduate students, 9, 21.  
 Graduation, 49.  
 Greek, 94.  
     for admission, 44.  
     honors in, 120, 121.  
 Gymnasium, 10.  
 History, 89.  
     American, 91.  
     constitutional, 91.  
     course in, 70.  
     English, 90.  
     for admission, 45.  
     general, 90.  
     honors in, 119, 120.  
     philosophy of, 92.  
 Honors, 118.  
     awarded, 155.  
 Hospital, 116.



- Horticulture, 76.
- Hygiene, 107.
- Instructors, 16.
- International law, 93.
- Italian, 98.
- Laboratories, anatomical, 107.
  - botanical, 104.
  - chemical, 85.
  - entomological, 76, 110.
  - geological, 105.
  - mechanical, 99.
  - of civil engineering, 86.
  - physical, 81.
- Languages, 94.
  - ancient classical, 94.
  - Germanic, 96.
  - Romance, 98.
  - Oriental, 98.
- Latin, 95.
  - for admission, 45.
  - honors in, 120, 122.
- Lecturers, 8, 16.
- Library, 19, 114.
- Licentiate, certificate of, 50.
- Literature, course in, 54.
  - English, 111.
  - general, 112.
- Lithology, 105.
- Machine-shop, 100.
- Mathematics, 99.
  - course in, 67.
  - for admission, 40.
  - honors in, 120, 122.
- Mechanic arts, 7, 100.
  - course in, 66.
- Medical chemistry, 84.
- Medical preparatory study, 110.
  - course in, 60.
- Military science, 7, 102.
- Mineralogy and metallurgy, 82.
- Mining engineering, 89.
- Moral philosophy, 113.
- Museum, botanical, 104.
  - entomological, 76, 110.
  - of civil engineering, 186.
  - of natural history, 19, 116.
  - palæontological, 106.
  - veterinary, 77.
  - zoölogical, 107, 108.
- Natural history, 103.
  - course in, 68.
  - museum of, 19, 116.
- Non-resident professors, 8, 16.
- Optional students, 9, 43.
- Organization and government, 7.
- Oriental languages, 98.
- Palæontology, 103.
- Payments, 48.
- Philosophy, 113.
  - course in, 55.
- Philosophy of history, 92.
- Physical culture, 10.
- Physics, 80.
  - course in chem. and physics, 61.
- Physiology for admission, 42.
- Political science, 92.
  - course in, 70.
- Preachers, 10, 20.
- Prizes, 117.
  - awarded, 155.
- Recitations, 45.
- Regents' certificates and diplomas, 43.
- Registration, 47.
- Registration day, 5, 6.
- Religious services, 9, 20.
- Residence and graduation, 47.
- Rhetoric, 112.
- Romance languages, 98, 48.
- Sage College, 9, 124.
- Scholarships, 124.
- Science, course in, 56.
- Science and letters, course in, 57.
- Shop-work, 99.
- Spanish, 98.
- Special courses, 58.
- Special faculties, 8, 18.
- Special students, 9, 45.
- State scholarships, 127.
- Terms and vacations, 47.
- Theses, 49, 50, 51.
- Trustees, 8, 12.
  - annual meeting of, 6.
- Tuition, 48.
- Vacations, 47.
- Veterinary science, 76.
- Women students, 9.
- Woodford prize, 117.
  - competition for, 6.
- Zoölogy, vertebrate, 107.
  - invertebrate, 109.